

# Environmental Resources Overview

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This section provides an overview of the natural and built environmental resources and land uses in the study area.

## Why did we study environmental resources in the I-90 corridor?

In order to help inform the corridor planning study recommendations, the I-90 Project Team produced an inventory of the natural and built resources and land uses in the corridor. This inventory portrays existing conditions and lists the environmental elements most likely to be included during environmental documentation for project design and construction. Conceptual planning studies are not required to meet the detailed analyses needed to comply with the National or State Environmental Policy Act (NEPA/SEPA). However, identifying the resources in the corridor during the planning process is helpful in understanding the potential resource issues that may be encountered in future project development phases. Source material produced in support of the transportation planning process may be incorporated into subsequent NEPA documents in accordance with FHWA and CEQ regulations.

Environmental elements described in this corridor plan consist of general information collected to identify and document potential issues as part of the transportation study process. Specific impacts to environmental elements would be determined, and associated permits obtained, when a project has been funded for design and construction.

As funding becomes available to move forward with the project list recommended in this corridor planning study, additional environmental analyses will need to be conducted.

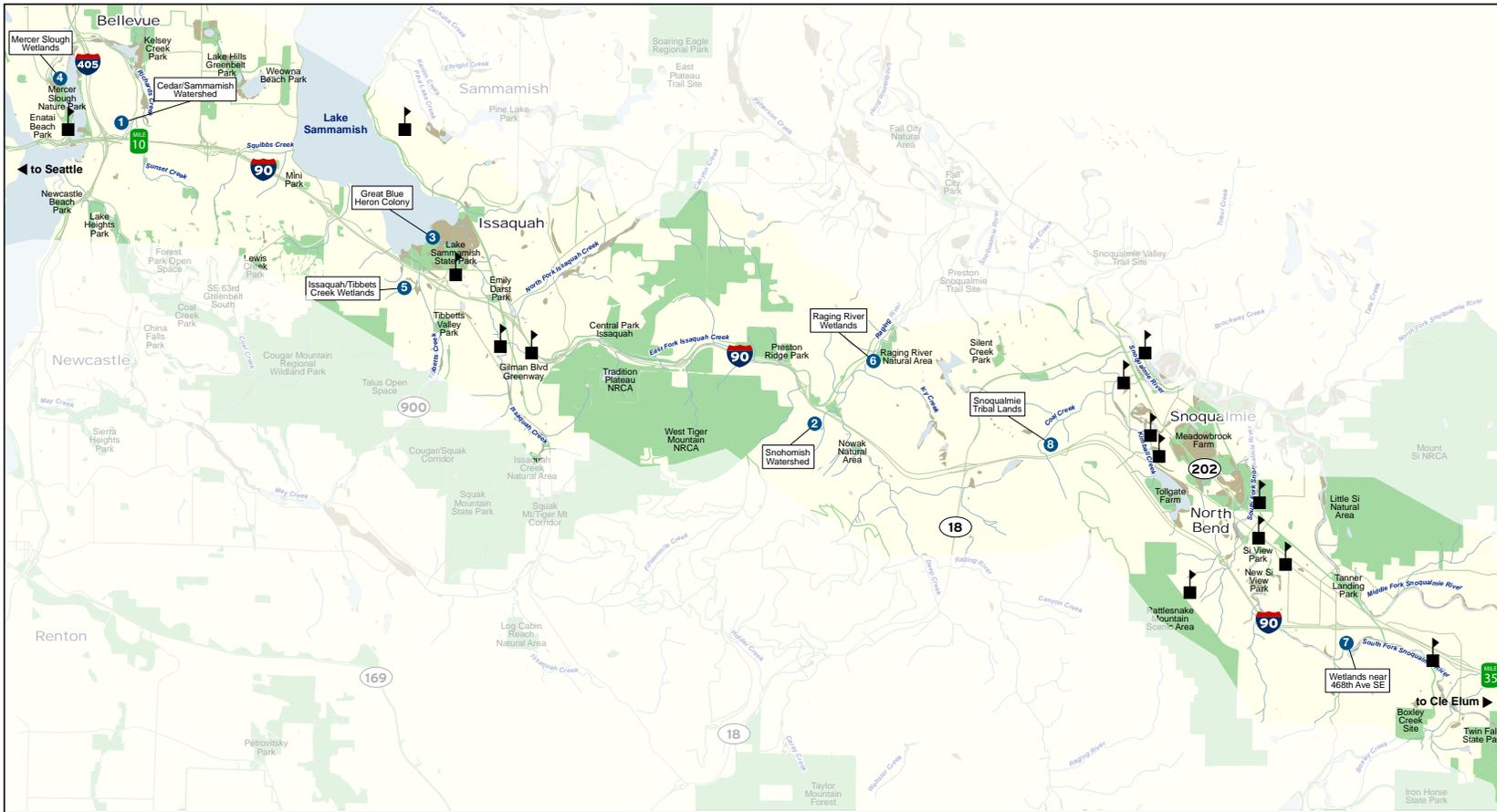
### Future

The environmental analyses may include, but are not limited to, the following:

- Geological Inventory
- Public Utilities
- Air Quality
- Extreme Weather
- Traffic Noise
- Wildlife Habitat
- Water Quality
- Agricultural Resources and Farmland
- Environmental Justice
- Hazardous Materials
- Historical, Cultural, and Archeological Resources
- Land Use Compatibility
- Parks
- Wetlands
- Wild and Scenic Rivers
- Streams and Fish Passage
- Floodplains
- Socioeconomic Groups

# What are the significant natural environmental resources in the corridor?

Exhibit 5.1 identifies the major natural environmental resources in the study area including water, wetlands, parks, and sensitive areas. The findings are discussed further below.



**Exhibit 5.1: Major Natural Environmental Resources in the Study Area**

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## Parks and Trails

Parks, recreation areas, and trails to consider during planning include:

- Enatai Beach Park (city of Bellevue)
- Lake Washington Loop bike route (city of Bellevue)
- BNSF Railroad conversion to bike trail (city of Bellevue)
- Old Boeing property (under redevelopment, including open space in city of Bellevue)
- Emily Darst Park (city of Issaquah)
- West Tiger Mountain/Tradition Plateau National Conservation Area (city of Issaquah and King County)
- Gilman Boulevard Greenway (Issaquah just east of SR 900)
- Preston Ridge Park (King County east of 270th Avenue SE)
- Preston Athletic Fields (King County east of 270th Avenue SE)
- Snoqualmie Valley Trail (King County, cities of Snoqualmie and North Bend)
- Mountains to Sound Greenway (all study area cities and counties)

## Mountains to Sound Greenway

The Mountains to Sound Greenway includes 100 miles of I-90 from the Seattle waterfront across Snoqualmie Pass and into the desert grasslands in Central Washington. Currently, most of the undeveloped landscape is in public ownership and includes 700,000 acres held by local, state, and federal agencies in trust for the public good. The Mountains to Sound Greenway is an important resource for the Pacific Northwest community. The greenway encompasses protected and working forests, farms, historic towns, lakes, campgrounds, rivers, trails, and wildlife habitat. WSDOT supports preservation of the open space and visual qualities of the greenway.

## Watercourses and Fish Passages

The I-90 Corridor Planning Study area traverses two major watersheds: the Cedar-Sammamish Water Resource Inventory Area 8 (WRIA 8), which includes King County, Bellevue and Issaquah, and the Snohomish (WRIA 7), which includes King County from the Raging River east to the cities of Snoqualmie and North Bend. Both watersheds contain numerous rivers and creeks; some of these waterways intersect I-90. Waterways located within 400 feet of I-90 are identified on the following pages.



*Lewis Creek near West Lake Sammamish Parkway is one of the waterways in the study area.*



**Exhibit 5.2: Water Resource Inventory Area**

Source: Washington State Department of Ecology ([www.ecy.wa.gov/services/gis/maps/wria/wria.htm](http://www.ecy.wa.gov/services/gis/maps/wria/wria.htm))

### What is a Water Resource Inventory Area (WRIA)?

A WRIA is a watershed area defined by natural boundaries including the shape of the land and flow of water. To ensure the health of the state's watersheds, the Department of Ecology has divided the state into 62 "Water Resource Inventory Areas" or "WRIAs" to delineate the state's major watersheds for planning and management purposes.

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## **Cedar – Sammamish Water Resource Inventory Area (WRIA) 8**

The Cedar-Sammamish watershed includes the following surface waters:

- Mercer Slough
- Richards Creek
- Sunset Creek
- Vasa Creek
- North Fork Issaquah Creek
- Tibbetts Creek
- Issaquah Creek
- Lower Kelsey Creek
- Lewis Creek
- East Fork Issaquah Creek

Eleven other unnamed surface waters cross the corridor. All creeks are tributaries to Lake Sammamish, except Sunset Creek, Richards Creek, and Mercer Slough. Sunset Creek and Richards Creek empty into Mercer Slough, which flows into Lake Washington.

Many of these waterways provide habitat for fish, both anadromous and resident. Anadromous fish are those that migrate from saltwater to freshwater. Species include Chinook and bull trout, with both listed as threatened under the Endangered Species Act (ESA), as well as Coho, cutthroat trout, and sea-run cutthroat trout.

## **Snohomish Water Resource Inventory Area (WRIA) 7**

The Snohomish watershed includes the following surface waters:

- Soderman Creek
- Raging River
- Lake Creek
- South Fork Snoqualmie River
- Clough Creek
- Kimball Creek
- Coal Creek

Soderman Creek and Lake Creek are tributaries to the Raging River. Coal Creek is a tributary to Kimball Creek, which discharges directly to the Snoqualmie River. Clough Creek empties to the South Fork Snoqualmie River, which flows into the Snoqualmie River.

Approximately 20 other unnamed waterways cross the I-90 corridor. Most of these waterways are characterized as hillside seeps, which convey water from the adjacent hills and slopes across the interstate. These waterways eventually flow into the Raging River or the South Fork Snoqualmie River.

The Raging River supports populations of Chinook, Coho, and pink salmon. Natural populations of salmon do not use the South Fork Snoqualmie River because of Snoqualmie Falls, a natural fish barrier in this river system. However, hatchery-raised Chinook and Coho salmon are occasionally planted in the South Fork Snoqualmie River, upstream of its confluence with the main stem (Williams, 1975).

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## **Wetlands and Habitat**

There are extensive wetland complexes in the study area, as discussed below. Prime habitat is commonly found adjacent to wetlands, and wetland areas also can support rare and endangered plant species communities. During project design more extensive environmental review will be needed to identify, avoid and minimize impacts to wetlands and to endangered and listed plant and animal species. Consultation may be required with state and federal agencies. For unavoidable impacts, mitigation may be necessary.

### **Issaquah Creek/Tibbets Creek Area (City of Issaquah)**

Within the Lake Sammamish sub-basin, near Issaquah Creek, there are forested, scrub-shrub, and emergent wetlands. These wetlands are associated with Tibbetts Creek, Issaquah Creek, and East Fork Issaquah Creek (NWI, 2004; WSDOT, 2002; King County, 2005). Although located more than 400 feet north of the project corridor, the wetlands associated with Issaquah Creek and Tibbetts Creek are regionally significant resources within Lake Sammamish State Park. Issaquah Creek supports a run of Puget Sound Chinook salmon as well as Coho and sockeye salmon.

### **Raging River/South Fork Snoqualmie River Area (King County and City of North Bend)**

There are substantial areas of wetlands between Issaquah Creek and the project's eastern terminus. These wetlands occur within the floodplain of the Raging River and the South Fork Snoqualmie River. There also are wetlands associated with several unnamed tributaries to the South Fork Snoqualmie River. While these wetlands provide habitat for fish, waterfowl, and other wildlife as well as enhance water storage and water quality functions, they are inaccessible to anadromous fish because of Snoqualmie Falls. A windshield survey indicated that these may be high-quality wetlands, likely classified as Category I or II wetlands.

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## 468th Avenue SE/I-90 Intersection Area (King County)

There are wetlands associated with the South Fork Snoqualmie River. Based on a windshield survey, there are potential areas of scrub-shrub wetlands on both sides of I-90 between the South Fork Snoqualmie River and the study's eastern terminus. The vegetated areas adjacent to the 468th Avenue Southeast off-ramp appear to be forested uplands.



*The study area is within the range of the North Rainier Elk Herd*

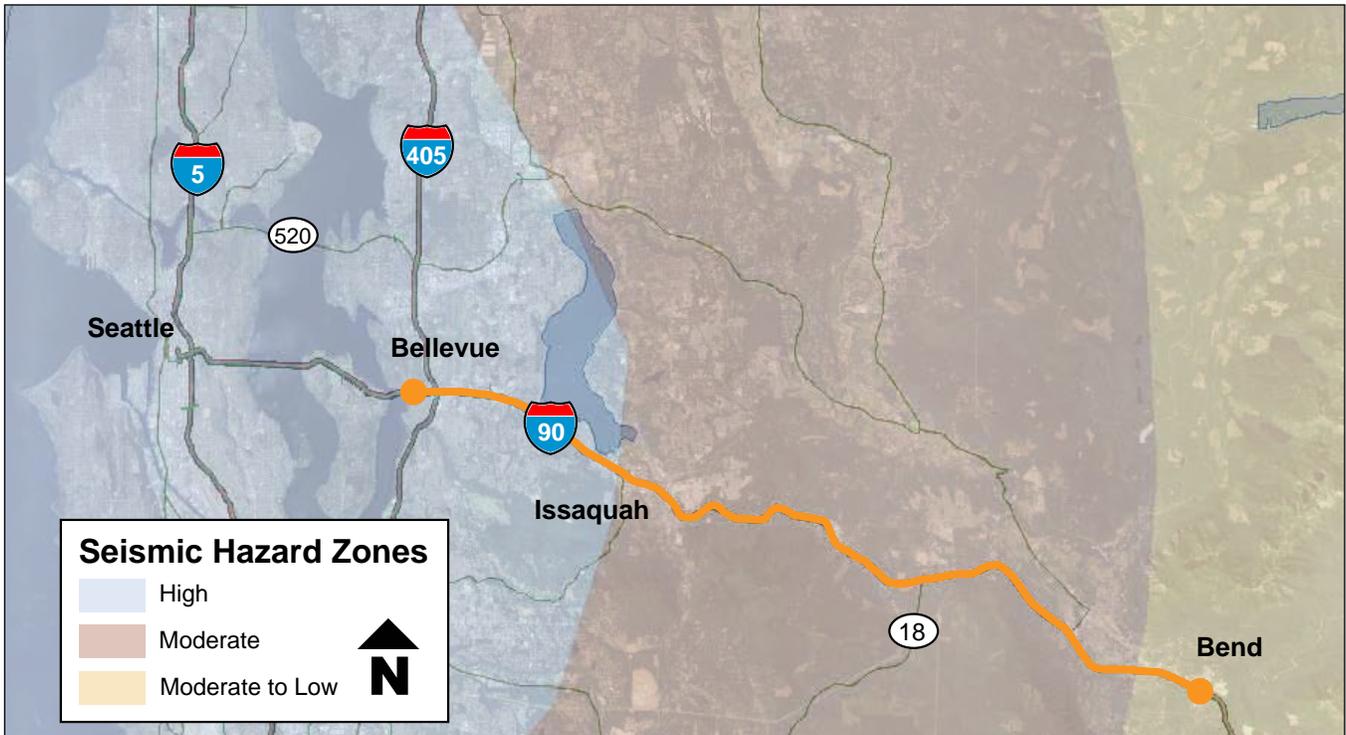
## Wildlife

According to state wildlife databases, priority habitats or species do not occur within 400 feet of the I-90 corridor (WDFW, 2006). However, portions of the I-90 corridor lie within the range of the North Rainier Elk Herd, one of 10 herds managed in the state. Areas along the north and south forks of the Snoqualmie River lie within the crucial winter range of the North Rainier Elk Herd. For management purposes, this herd was divided into eight game management units (GMUs). The Snoqualmie GMU, or sub-herd, is located within the study area and includes the greater Snoqualmie River and Skykomish River drainages.

A small but growing elk population resides in small groups mainly in the valleys of the Skykomish River and the north, south, and middle forks of the Snoqualmie River (WDFW, 2002).

Threats to elk populations include cougars and black bears, hunting, and road kills. Between 1976 and 2006, there were 39 reported road kills in the study area: 26 deer, nine elk, and four unidentified (WSDOT, 2006). Road kills were concentrated between milepost (MP) 10 and MP 30, with elk kills occurring between MP 25 and 32 .

Other species in the vicinity of the interstate include a great blue heron colony and an osprey nest. The great blue heron colony is located in Lake Sammamish State Park and the osprey nest is approximately 1,000 feet north of the I-90 westbound lanes, adjacent to North Fork Issaquah Creek.



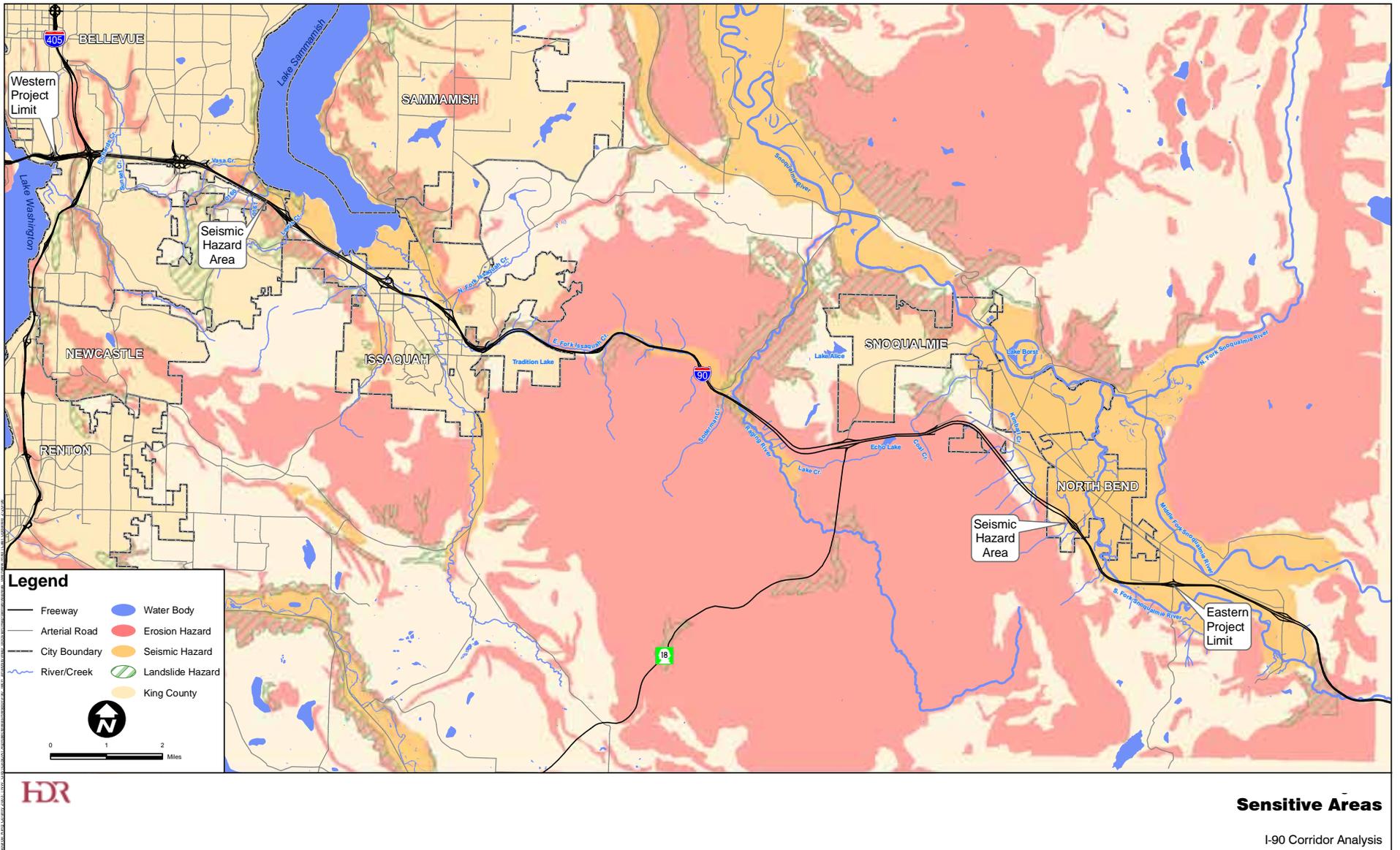
**Exhibit 5.3:** Seismic Hazard Zones

### **Other Sensitive Areas (Seismic, Erosion, and Landslide Locations)**

Other types of sensitive areas along the corridor are those that could be adversely impacted by seismic activity and those areas prone to erosion and landslides. Also included in this category are steep slopes and abandoned coal mines. Exhibit 5.4 shows areas with potential seismic and other sensitive area concerns along the corridor. These areas within the corridor are considered “red flags,” meaning they are areas to carefully consider during highway design, especially where part of the proposed highway improvements may include new retaining walls, noise walls, bridges, and other structures.

The project team reviewed available King County data regarding erosion, landslide, seismic, and abandoned coal mine hazard areas. The county’s seismic data indicates areas at risk for earthquake and liquefaction hazards. The team identified soil features in the area by using GIS data from the Department of Natural Resources (DNR) as well as liquefaction zone data. Both data sets are identified in Exhibit 5.4.

Most of the I-90 Corridor Planning Study area includes locations at risk for seismic, liquefaction, landslide, or erosion hazards. The liquefaction and seismic data show hazards near the I-405/I-90 interchange, from the area surrounding the West Lake Sammamish exit in Issaquah to East Sunset Way, as well as 270th Avenue Southeast, and from North Bend east to the end of the study area. The GIS data mapped around the SR 18 area shows moderate risk of seismic hazard.



**Exhibit 5.4: Sensitive Areas in the Study Area**

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Areas at risk for landslides occur on the steep slopes and hills north and south of I-90 near I-405 in Bellevue, East Sunset Way in Issaquah, and areas east to 270th Avenue Southeast and Soderman Creek. These hazards are also associated with the Lake Washington and Lake Sammamish areas.

Erosion hazards are common in the corridor in the Lake Sammamish area in Issaquah and most of the corridor area from East Sunset Way to North Bend. Erosion problems in the area were also identified during WSDOT's previous work at the East Sunset Way interchange.

From the available data provided by DNR, the exact same soil unit types are shown to exist from the I-405/I-90 Interchange to just east of Southeast High Point Way.

There is one abandoned coal mine hazard area sited just east of East Sunset Way near Issaquah.

## **Washington Climate Change**

Executive Order 07-02, Governor Christine Gregoire's Washington Climate Change Challenge, established the state's commitment to address climate change by reducing greenhouse gas emissions through strategies that reduce the amount of driving and vehicle miles traveled. The strategies recommended by the I-90 Corridor Planning Study to help address climate change, as outlined in Executive Order 07-02, include reinforcing CTR Programs, further analysis of bicyclist and pedestrian needs to encourage non-motorized travel, and inter-agency coordination with transit to encourage access to and use of transit.

In 2009, Governor Gregoire issued Executive Order 09-05, Washington's Leadership on Climate Change, which directs WSDOT to consult and collaborate with the Departments of Ecology and Commerce, local governments and other stakeholders in estimating current and future statewide levels of vehicle miles traveled (VMT); in evaluating potential changes to the VMT benchmarks established in RCW 47.01.440; and in developing additional strategies to reduce greenhouse gas (GHG) emissions from the transportation sector. The Governor's Executive Order (EO) also directs the department to work cooperatively with the four largest metropolitan planning organizations to develop and adopt regional transportation plans that will provide people with additional transportation alternatives, reduce GHGs, and achieve the annual per capita VMT statutory benchmarks.

The Washington Legislature passed laws in 2009 to encourage electric vehicles, create a sustainable energy trust, set goals for greenhouse gas emissions, improve energy efficiency, establish a climate change/land use work group, and support commute trip reduction for state agencies. Climate change is addressed at the following WSDOT website:

[www.wsdot.wa.gov/SustainableTransportation/](http://www.wsdot.wa.gov/SustainableTransportation/)

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## What are the features of the built environment in the study area?

The team prepared an inventory of the built environment in the study area by collecting information from a variety of sources. These sources included windshield surveys, comprehensive plans for the cities along the corridor, databases of leaking underground storage tanks from WSDOT and the Washington State Department of Ecology, various hazardous waste databases maintained by the U.S. Environmental Protection Agency (EPA), as well as other Internet databases such as the National Park Service's National Register of Historic Places and the Washington State Department of Archaeology & Historic Preservation.

### Land Use, Parks, and Recreation Areas

#### City of Bellevue

##### Land Use

The areas surrounding the I-90 corridor through Bellevue are developed commercially. The city's comprehensive land use plan was adopted in December 1993 and updated in December 2003. The land use designations along I-90 include community business, office, office/limited business, light industrial, and urban and high density residential. Along both sides of the corridor there are frontage roads and parkways. An old Boeing property is currently under redevelopment planning that will include open space located between 161st Street Southeast and 156th Avenue Southeast and 161st Avenue Southeast.

##### Parks and Recreation

Enatai Beach Park is situated between Lake Road and the Lake Washington shore underneath the elevated portion of I-90 and south of I-90. The park includes a swimming dock, restrooms, and a boathouse.

The Mercer Slough Nature Park is a regional park that crosses I-90 just west of I-405 in Bellevue. The park has more than 300 acres of wetlands and provides extensive wildlife habitat.

Another recreational feature is the Lake Washington Loop bike route, which passes under I-90 at 118th Avenue Southeast. Also, the abandoned Burlington Northern Santa Fe (BNSF) rail line is currently planned to be converted to a non-motorized trail and it would cross I-90 and connect to the existing I-90 Trail. Ultimately, the BNSF corridor could become a shared-use trail to support future high capacity transit.

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## **City of Issaquah**

### **Land Use**

Land use in the area where I-90 enters Issaquah is mostly low-density residential surrounding or related to Lake Sammamish and Lake Sammamish State Park. A windshield survey of Issaquah in the area around I-90 indicated that it is mostly developed. According to the city of Issaquah Land Use Designation Map (revised January 17, 2005), the remainder of the areas around the I-90 corridor are primarily retail and commercial. Retail land use in Issaquah consists of business district development, retail, and professional office. Retail is the major land use in the area. Land uses also include intensive commercial, light industrial, and mineral resources.

The city of Issaquah is currently in the process of finalizing a draft subarea plan for Central Issaquah that will guide the redevelopment of more than 900 acres in the center of Issaquah from strip mall development to a cohesive downtown center.

### **Parks and Recreation**

Lake Sammamish State Park is a 512-acre, multi-use park close to I-90. Other parks along I-90 through Issaquah include Emily Darst Park located east of East Lake Sammamish Parkway and north of I-90 and the West Tiger Mountain/ Tradition Plateau Natural Resources Conservation Area (NRCA) south of I-90 at the east end of the city. The Gilman Boulevard Greenway runs parallel to and crosses the I-90 corridor. A city shop site (assumed to be used by city parks staff) north of I-90 and southeast of Gilman Boulevard is also used as recreational property.

East of Issaquah, the Tiger Mountain State Forest borders I-90 on the south between East Sunset Way and the 272nd Southeast Avenue intersection. The Washington State Department of Natural Resources owns 14,000 acres of forest land that has more than 70 miles of hiking trails.

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## **City of Sammamish**

### **Land Use and Open Space**

A transfer of land to Sammamish occurred in 2008 when three parcels of land owned by the city of Redmond became part of Sammamish Landing, a park being created along the northern shore of Lake Sammamish. The 2.36 acres were added to a collection of city and county-owned land when the Redmond City Council approved the land transfer. Sammamish will eventually complete a 3,000-foot-long recreational park along the shoreline. Sammamish Landing is now going through its master planning process and will be completed when funding is available for the park.

## **City of Snoqualmie**

### **Land Use and Open Space**

Land uses north of I-90 in the city of Snoqualmie are planned commercial/industrial, residential, and office. On the south side of I-90, east of 372nd Avenue Southeast, there is an open space area with access via Winery Road. There is an eight acre park called Snoqualmie Point Park (37580 SE Winery Road) that was acquired in 2000 by efforts of the Trust for Public Lands the US Forest Service, the City of Snoqualmie and Mountains To Sound.

## **City of North Bend**

### **Land Use and Open Space**

The existing and planned land uses surrounding I-90 in North Bend are commercial and residential. The north side of North Bend Boulevard is surrounded with commercial and retail development, which includes gas stations, grocery stores, and the Great Northwest Factory Stores. Other areas surrounding both Mount Si Boulevard and South Fork Avenue in North Bend have residential development. A church is adjacent to I-90 on the north side. The church and neighboring retail properties abut I-90. There is a frontage road between the residential development and I-90. The south side of I-90 at the North Bend Way interchange is residential, although the land use map illustrates an open space area adjacent to I-90.

The area east of North Bend to the 436th Avenue Southeast interchange is residential development. In general, there are trees or other buffers between the interstate and the residential structures. However, the residential lots closest to the intersection at 436th Avenue Southeast and 142nd Street Southeast are separated from the interstate by a small buffer including a ditch or a hill. There is a golf course across 142nd Street on the south side of I-90. It is not close enough to I-90 to likely be a concern, but it is the closest open space in that area.

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## **Community of Preston**

### **Land Use and Open Space**

Preston is a historic mill town on the northeast edge of the large Tiger Mountain State Forest along I-90. The Raging River feeds into the Snoqualmie River nearby at Fall City.

### **North Bend to 468th Avenue Southeast**

The King County land use designations around I-90 east of North Bend to the I-90/468th Avenue Southeast interchange are rural residential or unincorporated city urban growth area. The Snoqualmie Valley Trail crosses I-90 from the Tanner Landing Park on the north to the east side of the Riverbend area about one-half mile east of 436th Avenue Southeast.

## **King County**

### **Land Use**

Between Bellevue and Issaquah there is an approximately one-mile stretch that is part of unincorporated King County. The land use designation in the area is urban residential. The Sammamish Bluff Apartments are located immediately adjacent to the I-90 noise wall.

Rural King County land is situated between Issaquah and North Bend. The rural setting surrounding I-90 contains open spaces and remaining pasture lands.

Preston, a small rural community in unincorporated King County, is an old mill town that currently has commercial development including a general store, a granite manufacturer, and the Preston Park-and-Ride (serviced by King County Metro Transit) adjacent to I-90.

### **Parks and Recreation**

The Preston area includes Preston Ridge Park, located just outside the 400-foot study area focus, and the Field of Champions Athletic Fields on Southeast High Point Way, which is nearby but not adjacent to I-90.

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## Historic, Cultural, and Archaeological Resources

Further cultural resources survey work will likely be required during project design. WSDOT cultural resource staff will aid project design to avoid and minimize impacts to cultural resources and to mitigate where impacts are unavoidable. For the project to comply with section 106 of the National Historic Preservation Act and Executive Order O5-05, the project will be required to initiate consultation with affected tribes and other interested parties.

The National Register of Historic Places includes 14 registered historic sites in the vicinity of the study area listed below in Exhibit 5.5 (National Park Service, 2010). Most of the sites are not within 400 feet of I-90 but may be accessed via I-90. The exception is Pickering Farm, which is located on nine acres adjacent to I-90 in Issaquah (DAHP, 2010). The farm includes Pickering Barn, recreational areas, a seasonal public market, and wetland areas adjacent to Issaquah Creek (city of Issaquah, 2010). Further Section 4(f) and 6(f) evaluation will also likely be required during project design.

Section 4(f) of the Department of Transportation Act (DOT Act) of 1966 stipulates that the Federal Highway Administration (FHWA) and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

- There is no feasible and prudent alternative to the use of land.
- The action includes all possible planning to minimize harm to the property resulting from use.

Section 6(f) refers to the Land and Water Conservation Fund Act, which act:

- establishes a land and water conservation fund to assist local, state, and federal agencies in meeting the demand for present and future outdoor recreation sites. This is done through grants for land acquisition, park amenities, and other park development costs.
- Once a city, county, or agency has used Section 6(f) for funds, either the land or the park appurtenances cannot be eliminated or acquired without coordination with the National Park Service (NPS) and mitigation that replaces the eliminated items. The mitigation must be at least at a ratio of 1:1, for both quality and quantity.

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**Exhibit 5.5: Registered Historic Sites in the Vicinity of the Study Area**

Resource Name	Address	City	List Date
Winters, Frederick W., House	2102 Bellevue Way SE	Bellevue	4/21/1992
Brandes House	2202 212th Avenue SE	Issaquah	12/14/1994
Issaquah Depot	Rainier Avenue N	Issaquah	9/13/1990
Issaquah Sportsmen's Club	23600 SE Evans St	Issaquah	11/19/1998
Pickering Farm	21809 SE 56th St	Issaquah	7/7/1983
Camp North Bend	45509 SE 150th St	North Bend	4/29/1993
McGrath Cafe and Hotel	101 W North Bend Way	North Bend	2/21/2002
Norman Bridge (North Fork Snoqualmie River)	Old 428th Avenue SE	North Bend	7/19/1994
North Bend Ranger Station	42404 SE North Bend Way	North Bend	3/6/1991
Seattle Municipal Light and Power	20030 Cedar Falls Rd SE	North Bend	9/11/1997
Snoqualmie Depot	109 King St	Snoqualmie	7/24/1974
Snoqualmie Falls Cavity Generating Station	N of Snoqualmie on Snoqualmie River	Snoqualmie	4/23/1976
Snoqualmie Falls Hydroelectric Power Plant Historic District	WA 202, 0.5 mi. N of Snoqualmie	Snoqualmie	10/24/1992
Snoqualmie School Campus	Silva and King Sts.	Snoqualmie	3/16/1989

*Source: National Park Service, 2010*

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## Hazardous Materials

The Department of Ecology identified 13 locations adjacent to or near an exit of the I-90 corridor with leaking underground storage tanks (LUST). These sites are associated with gas stations and light industrial land uses and have reasonably predictable hazardous waste conditions. They are listed below in Exhibit 5.6.

### Exhibit 5.6: Leaking Underground Storage Tanks in the Immediate Vicinity of the Study Area

Site Name	Address	City	Zip	Facility
Chevron # 9-2022	3725 150th SE	Bellevue	98006	8613585
Factoria 76	3727 Factoria Blvd SE	Bellevue	980061207	17157849
Texaco #63-232-0277	3670 150th Ave SE	Bellevue	980061686	11244769
Lakeside Industries	13620 SE Eastgate Way	Bellevue	980054414	2544
Lincoln Executive Center (former gas station)	3380 146th Pl SE, Bldg E	Bellevue	98007	11731557
Byron Shell	3230 156th Avenue SE	Bellevue	980076529	7687549
Texaco #63-232-0044	3240 156th Avenue SE	Bellevue	980076529	56989873
King Co/Issaquah Pub Wrks	23240 SE 74th	Issaquah	98027	69352115
WSDOT Newport Way Exit	SR 901 Westbound	Issaquah	98027	65575889
Henry Bacon Building Materials	5210 E Lk Sam. Pkwy SE	Issaquah	980279266	8428648
MC Anderson Trucking	44711 SE North Bend Way	North Bend	980450354	14722754
Cascade Autovon Company	12727 412th Avenue SE	North Bend	980459416	36296841
Puget Sound Power & Light	44429 SE Tanner Rd	North Bend	98045	65553121

Source: Ecology Facility / Site Database (provided by WSDOT).

In addition, six sites were identified in the project vicinity that use, transport, or dispose of hazardous materials or wastes, and/or are sites where hazardous wastes or materials are known to have been released to the environment (EPA data provided to WSDOT). Two of these sites are identified in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Superfund sites. These sites are located in Factoria (Factoria Pit /Sunset Ravine Park) and in Issaquah (Palmer Coking Coal Company). These sites could represent substantially contaminated locations. However, the sites are located a considerable distance away from the I-90 corridor. It is likely that the sites could be avoided during implementation of any improvement project along those segments of the corridor.

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## Public Services and Public Transportation Facilities

Public services and public transportation facilities in the vicinity of the I-90 Corridor Planning Study area are summarized below. This is not an exhaustive inventory and focuses on existing facility locations and access to them from I-90. Exhibits 5.7, 5.8, and 5.9 are lists of service providers in Bellevue, Issaquah, and North Bend.

### Bellevue

The Factoria Police Department is located southeast of the I-90 interchange with I-405. Two medical facilities are adjacent to I-90: a neighborhood clinic operated by the University of Washington Medical Center and Eastgate Public Health Center operated by the King County Health Department. Bellevue College is located near the 148th Avenue Southeast interchange. The Eastgate Park-and-Ride is located on Eastgate Way and has direct access ramps from I-90. The South Bellevue Park-and-Ride, operated by Sound Transit, is accessed via I-90 on Bellevue Way Southeast. The South Bellevue Park-and-Ride provides more than 500 parking stalls (Sound Transit, 2007).

#### Exhibit 5.7: Public Services: Bellevue

Service Provider	Address	City	Zip	Phone
Factoria Police Department	4051 Factoria Blvd SE	Bellevue	98006	(425) 452-2880
U.W. Neighborhood Clinic	13231 SE 36th St	Bellevue	98006	(425) 957-9000
Eastgate Public Health Center	14350 SE Eastgate Way	Bellevue	98007	(206) 296-4920
Bellevue College	3000 Landerholm Cir SE	Bellevue	98007	(425) 564-1000
South Bellevue Park and Ride	2700 Bellevue Way SE	Bellevue	N/A	N/A
Eastgate Park and Ride	14200 SE Eastgate Way	Bellevue	N/A	(206) 553-5000
King County (Factoria) Transfer Station	13800 SE 32nd Street	Bellevue	98005	(206) 296-4466

Source: *Google Maps, 2007; Sound Transit, 2007.*

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## Issaquah

Public services for Issaquah city residents are located adjacent to and directly accessed via I-90. The King County Fire District Number 10 and Eastside Fire and Rescue are located on Newport Way Northwest; the Issaquah Police Department is located on East Sunset Way. City Hall and City Hall South are located at 130 and 135 East Sunset Way; and City Hall Northwest is located north of I-90 at 1775 12th Avenue Northwest.

Overlake Medical Center Urgent Care and the University of Washington Medical Center Neighborhood Clinic are accessed via Newport Way or Front Street North. Swedish Medical Center is located adjacent to I-90 in Issaquah.

To meet the health-care needs of the fast-growing communities of Issaquah and Sammamish on the eastside, Swedish opened a new medical center in the Issaquah Highlands. The new Swedish/Issaquah Medical Center campus occupies 18 acres and is being developed in two stages. Medical offices and an outpatient center opened in July 2011 and the hospital is scheduled to open in November 2011.

King County Library Facility, Issaquah Historical Society, and Issaquah Community Center are accessed via Newport Way. Issaquah Library is accessed via Front Street and East Sunset Way. Issaquah Middle Schools are accessed via Newport Way, and Issaquah High Schools are accessed via East Sunset Way and 2nd Avenue Northwest.

Mountain Creek Christian Fellowship and Issaquah First Church of Christ are accessed via Front Street North. Abide Baptist Church is accessed via East Sunset Way. Trinity Evangelical Church is located adjacent to I-90 in High Point.

The Issaquah Park-and-Ride, operated by Sound Transit, is accessed via Newport Way and SR 900. The transit center includes an 819-stall parking garage, bus loading platforms, bicycle storage, and other amenities. The Issaquah Transit Center opened in July 2008.

Another Sound Transit facility, the Issaquah Highlands Park-and-Ride, is located on High Street and is accessed from I-90 via Highlands Drive Northeast. The Issaquah Highlands Park-and-Ride provides more than 1,000 parking stalls.

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**Exhibit 5.8: Public Services: Issaquah**

Service Provider	Address	City	Zip	Phone
Issaquah Police Department	130 E Sunset Way	Issaquah	98027	(425) 837-3200
King County Fire District No. 10	175 Newport Way NW	Issaquah	98027	(425) 392-3433
Eastside Fire & Rescue	175 Newport Way NW	Issaquah	98027	(425) 392-3433
Overlake Urgent Care	6520 226th PI SE # 150	Issaquah	98027	(425) 688-5777
U.W. Neighborhood Clinic	1455 11th Ave NW	Issaquah	98027	(425) 391-3900
Swedish Medical Center	2005 NW Sammamish Rd	Issaquah	98027	(425) 394-0700
King County Library Facility	960 Newport Way NW	Issaquah	98027	(425) 369-3200
Issaquah Historical Society	165 SE Andrews St	Issaquah	98027	(425) 392-3500
Issaquah Community Center	301 Rainier Blvd S	Issaquah	98027	(425) 837-3300
Issaquah Middle School	400 1st Ave SE	Issaquah	98027	(425) 837-6800
Issaquah High School	700 2nd Ave SE	Issaquah	98027	(425) 837-6000
Mountain Creek Christian	165 N Front Street	Issaquah	98027	(425) 391-3416
Issaquah First Church of Christ	195 N Front Street	Issaquah	98027	(425) 392-8140
Abide Baptist Church	605 E Sunset Way	Issaquah	98027	(425) 890-4444
Trinity Evangelical Church	26729 SE 76th Place	Issaquah	98027	(425) 392-2546
Issaquah Transit Center	1050 17th Ave NW	Issaquah	N/A	N/A
Issaquah Highlands Park & Ride	951 NE High Street	Issaquah	N/A	N/A
Issaquah Library	10 W Sunset Way	Issaquah	98027	(425) 392-5430
City Hall	130 E Sunset Way	Issaquah	98027	(425) 837-3000
City Hall South	135 E Sunset Way	Issaquah	98027	(425) 837-3000
City Hall Northwest	1775 12th Avenue NW	Issaquah	98027	(425) 837-3000

Source: Google Maps, 2007; Sound Transit, 2007.

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## North Bend

The public services located in North Bend are accessed via Bendigo Boulevard South from I-90. This includes the Mayor's office and the elementary school.

The city of North Bend has its fire protection provided by Eastside Fire & Rescue. The city joined this consolidation of several fire departments in 1999. The North Bend fire station is located at 112 West 2nd Street.

The Eastside Fire and Rescue serves Carnation, Issaquah, North Bend, Sammamish, and Preston.

Snoqualmie Valley Hospital is located near I-90 on Northeast North Bend Way. Meadowbrook Urgent Care, serving North Bend, is accessed via Bendigo Boulevard South from I-90. A branch of the YMCA is located near I-90 in Preston.

### Exhibit 5.9: Public Services: Preston – North Bend

Service Provider	Address	City	Zip	Phone
North Bend Mayor's Office	211 Main Ave N	North Bend	98045	(425) 888-1211
North Bend Elementary	400 E 3rd St	North Bend	98045	(425) 831-8400
Snoqualmie Valley Hospital	9575 Ethan Wade Way SE	Snoqualmie	98065	(425) 831-2300
Meadowbrook Urgent Care	209 Main Ave S # 115	North Bend	98045	(425) 831-2380
YMCA Preston	31112 85th Place SE	Preston	98050	(425) 222-5007
Preston Park and Ride	30303 SE High Point Way	Preston	N/A	N/A

Source: Google Maps, 2007, WSDOT, 2007.

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## Chapter 6:

# Proposed Improvements, Planning Level Cost Estimates, and Benefit/Cost Analyses

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This section provides descriptions, forecast modeling and traffic simulation results, as well as planning level cost estimates (based on less than 1% design) of the proposed improvements considered in this corridor plan. To identify the most sustainable, reliable and cost-effective improvements, a Benefit/Cost (B/C) analysis, as required by RCW 47.06.130, was completed to compare the benefits and costs of the proposed improvements. The Screening Criteria Scoring Matrix is in Appendix F. Descriptions of the improvements that were considered and eliminated are in Appendix G.

As the economy recovers, traffic conditions or multi-modal services change, or if there are land use changes along the corridor in the future, the data that was used to develop the proposed recommendations should be updated or reevaluated. It is possible that some of these recommendations may not be needed if condition change or if other improvements address the safety or operational issue identified in this study.

## Data and Evaluation Tools

WSDOT's traffic, safety, and GIS information were the primary data sources. The PSRC's 2030 Travel Forecast Model and a VISSIM traffic simulation model were the primary evaluation tools.

The VISSIM traffic simulation model was used to analyze traffic flow on the I-90 mainline, and the queues at the interchanges between Eastgate Way (Bellevue) and the Sunset Interchange (Issaquah) where most of the congestion occurs in the study area. The Highway Capacity Software was used for evaluating existing and future traffic operations east of Issaquah to 468th Ave in North Bend where there are lower traffic volumes.

### PSRC's 2030 Model Transit Assumptions

In addition to existing transit service and facilities, the PRSC's 2030 Travel Forecast Model assumes the following in east King County:

Light Rail from Seattle to Bellevue/Redmond via the I-90 Floating Bridge

950+ additional parking stalls at the South Bellevue Park-and-Ride for the Light Rail Station

49,000 additional Sound Transit Express Bus service hours in East King County

All day, two-way service to the Snoqualmie Ridge and increased service to the Issaquah Highlands Park-and-Ride provided by King County's Transit Now

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## Development of the Proposed Improvements

### Moving Washington principles & building on existing investments

The proposed improvements apply the Moving Washington principles of reducing congestion and improving mobility by addressing maintenance, safety, system efficiency, demand management and adding capacity strategically. They also build upon a range of existing programs, infrastructure, transit service, and traffic management systems.



### Improvements of Special Interest

In addition to using Moving Washington principles, a number of the proposed improvements were identified and evaluated because they resonated with stakeholders. Analyses and evaluation of “Improvements of Special Interest” show benefit to I-90 and the local network.

### Key Findings That Informed the Recommendations

Freeway operations, including volumes, speeds and collisions within the corridor study area were analyzed to help identify current and future travel characteristics for the years 2005, 2015 and 2030.

Key findings from the I-90 traffic analyses include:

- I-90 will continue to operate as it does today, with peaks flows that occur westbound in the morning and eastbound in the evening.
- Current and future congestion on the mainline is mainly a result of congestion at the major interchanges (i.e. I-405, Eastgate Way, and SR 900) that spill back from the ramps onto the mainline.
- Currently there is, and will continue to be, available capacity in the HOV lane.
- In the future, congestion will increase at a greater rate in the Issaquah area than in the Bellevue area because of the projected land use and population growth in Issaquah.
- Light Rail to Bellevue will meet some of the travel demand in the western portion of the study area.

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## Existing Investments

### Traffic Management Center – 24 hours a day, 7 days a week

WSDOT traffic engineers and other staff manage and monitor freeway operations at a Traffic Management Center (TMC). The TMC monitors freeways in the Puget Sound Region including I-90 between Bellevue and Issaquah and uses real time data to:

- Identify traffic problems using cameras
- Provide traffic engineers and the public with real-time information about speed and ramp volumes
- Coordinate response with the Washington State Patrol and other law enforcement and emergency response crews when responding to incidents on the highway
- Provide up-to-the-minute information about what is happening on the roadway including weather, incidents, construction, and some travel times to drivers through highway advisory radios, electronic signs, the web, and the 511 traveler information phone system
- Provide up-to-the-minute information to news reporters



**Exhibit 6.1:** TMC at WSDOT in Shoreline

### Ramp Metering

WSDOT operates ramp meters on all westbound on-ramps between the I-405 Interchange in Bellevue and the Sunset Interchange in Issaquah as well as two eastbound ramps at 148th Ave SE/SE 37th St at Eastgate Way in Bellevue. Currently there are no ramp meters on the Lakemont (Bellevue), SR 900 or Front Street (Issaquah) eastbound on-ramps. Providing meters and cameras at these three locations will complete the ramp metering system between Bellevue and Issaquah.

## Variable Message Signs

There are currently 10 locations on I-90 within the study that have variable message signs. The signs are used to post real-time messages to drivers. The messages cover safety, roadway closures, traffic and/or Amber Alerts. The table below provides the location and type of variable message signs in the corridor.

Variable Message Signs – Eastgate to North Bend		
Direction	Milepost	Sign Type
WB	9.97	ATM - 2 SMS, 4 LCS
EB	10.1	ATM - 1 SMS, 4 LCS
EB	10.61	ATM - 2 SMS, 6 LCS
WB	10.5	ATM - 1 VMS, 5 LCS
WB	11.19	ATM - 1 VMS, 4 LCS
EB	11.31	ATM - 1 VMS, 5 LCS
WB	11.71	ATM - 1 VMS, 4 LCS
EB	14.78	1 Standalone VMS
EB	21.4	1 Standalone VMS
WB	26.23	1 Standalone VMS

VMS = Variable Message Sign - a large multi line sign used to post messages to drivers  
 SMS = Side mount sign - a small sign located on the side of an ATM gantry  
 LCS = Lane control sign - a small sign located over each lane used for lane control & variable speeds



*Eastgate Park and Ride/Direct Access Ramp*

## Eastgate Direct Access Ramp

Direct access ramps allow transit, vanpools, carpools and motorcycles to directly access the high occupancy vehicle (HOV) lanes in the center of the freeway without having to weave cross the other lanes of traffic. Direct access also provides travel time savings and increased safety for all freeway traffic. WSDOT, Sound Transit and the Federal Transit Authority funded the Eastgate Way Park & Ride Direct Access Ramp (opened in 2006).



*Issaquah Transit Center*

## Transit Service and Park& Ride Lots

King County Metro and Sound Transit provide bus service that uses the I-90 HOV lane, many of which use the Eastgate Way Direct Access Ramp to serve the Eastgate Way Park & Ride, the Issaquah Transit Center and the Issaquah Highlands Park & Ride.

King County Metro also provides numerous local transit routes that connect neighborhoods along the corridor as well as and a park and ride lot in North Bend.



*Issaquah Highlands Park and Ride*

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## **Screening Criteria**

The proposed improvements were evaluated in a screening process in order to assess which ones would provide the most transportation benefit and the least disruption to the natural and built environments.

The screening criteria were based on project goals and objectives within five main categories – Operations, Transit/HOV Operations, Freight Operations, Constructability and Environmental Factors. The criteria were further split into subcategories. The list of measures is given below.

### **Operations**

- Corridor Travel Time
- Throughput Capacity
- Safety
- Consistency

### **Transit/HOV Operations**

- Speed and Reliability
- Occupancy Throughput
- Freight Operations
- Speed and Reliability

### **Constructability**

- Construction Impacts to Users
- Impacts to Landslide Hazards
- Impacts to Seismic Hazards

### **Environmental Factors**

- Wetland Impacts
- Stream/Riparian Impacts
- Section 4(f) and 6(f) Impacts
- Visual Quality Impacts

## Proposed Improvements

The proposed recommendations are presented west to east, not in order of priority. The description and benefits of each improvement is provided in the following text.



- |  |  |   |   |
|--|--|---|---|
| 1. Convert Existing WB & EB HOV into High Occupancy Toll Lanes               | 4. I-90/EB Eastgate to W Lake Sammamish Parkway Peak Use Shoulder Lane | 7. Lakemont Off Ramp Modification                             | 10. Preston-Fall City Road Ramp Traffic Control                     |
| 2. ATM – Variable Speed Zone and Lane Control                                | 5. Eastgate Interchange Rechannelization                               | 8. Vicinity of 11th/12th Avenue NW Overcrossing/Direct Access | 11. I-90/SR 18 Interchange ATM Variable Speed Zone and Lane Control |
| 3. I-90/WB W Lake Sammamish Parkway to E Sunset Way – Peak Use Shoulder Lane | 6. W Lake Sammamish Parkway Roundabout                                 | 9. Front Street Interchange Reconstruction                    | 12. 436th Avenue SE Traffic Control                                 |

**Exhibit 6.2:** Recommended Improvements on the I-90 Corridor

Note: Improvements presented west to east.

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## Proposed Improvement 1:

### Convert the existing westbound and eastbound High Occupancy Vehicles Lanes into Express Toll Lanes (also known as High Occupancy Toll Lanes) MP 9 - 16

#### Background

Currently, the I-90 HOV lane has a 2+ occupancy requirement between 5 a.m. and 7 p.m. and is open to all traffic between 7 p.m. and 5 a.m. seven days a week. The peak hour volume is approximately 850 – 1,000 vehicles.

The PSRC's travel forecast model assumes that by 2030 the HOV occupancy requirement will be 3+ on the Puget Sound freeway HOV system. This policy change will result in fewer vehicles that are eligible to use the HOV lane than today.

#### HOT Lanes

High occupancy toll (HOT) lanes are high occupancy vehicle (HOV) lanes for carpools, vanpools and buses that are also open to solo drivers who choose to pay a toll. Toll rates are adjusted electronically to ensure that traffic in the HOT lane is free flowing (at least 45 miles per hour 90 percent of the time) even when the regular lanes are congested.

The number of vehicles a HOT lane can typically accommodate and maintain at greater, or equal to 45 mph, is 1,800 vehicles/hour. When the speed in the HOT lane drops below 45 mph, the toll rate increases to manage the number of vehicles in the HOT lane. Currently 850 – 1,000 vehicles use the I-90 HOV lanes during the peak hour, providing capacity for 800 – 950 more vehicles in the lane.

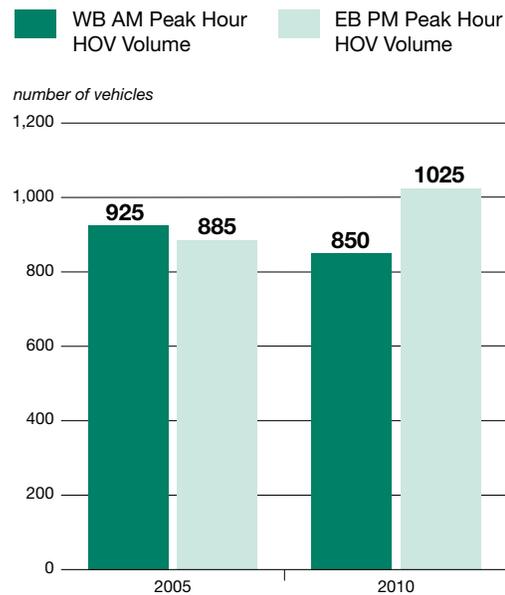


Exhibit 6.3: Peak hour HOV volumes

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## Description

Toll collection equipment, including gantries and roadway loops, will be installed approximately every half mile between Bellevue and Issaquah. Speed and volume information gathered by the loops will be sent to a computer that will automatically adjust the toll rates; the toll rates will be displayed on the signs above the HOT lane. The number of vehicles entering the HOT lanes will be managed to ensure that transit, vanpools and other drivers in the HOT lanes are able to travel at least 45 mph 90 percent of the time during the peak hour.

**Note:** *This improvement will require additional analyses including detailed traffic, engineering and environmental studies as well as extensive public outreach to obtain authorization by the legislature. Occupancy requirements, toll exemptions and toll rates will be set by the Transportation Commission if this improvement is implemented.*

## Benefit

Converting the HOV lanes into HOT lanes will optimize use of the existing lane. Minimal new pavement will be needed to provide a 12' HOT lane with a 2 - 4' buffer, three 12' foot general purpose lanes and 10 - 12' shoulders. After construction, approximately 15% more vehicles will move through the corridor and general purpose traffic will save up to seven minutes of travel time. Drivers willing to pay a toll to use the HOT lane will have an option of congestion free travel not currently available to them. Speed profiles of the general purpose lanes and HOT lanes can be found in Appendix H.

## Planning Level Cost Estimate

\$19 Million (2009 \$)

**Benefit/Cost Ratio: 2**



**Exhibit 6.4:** SR 167 HOT lane – shown as example

## Proposed Improvement 2: Variable Speed Limits/Lane Control System (Bellevue to Issaquah) MP 9 - 10

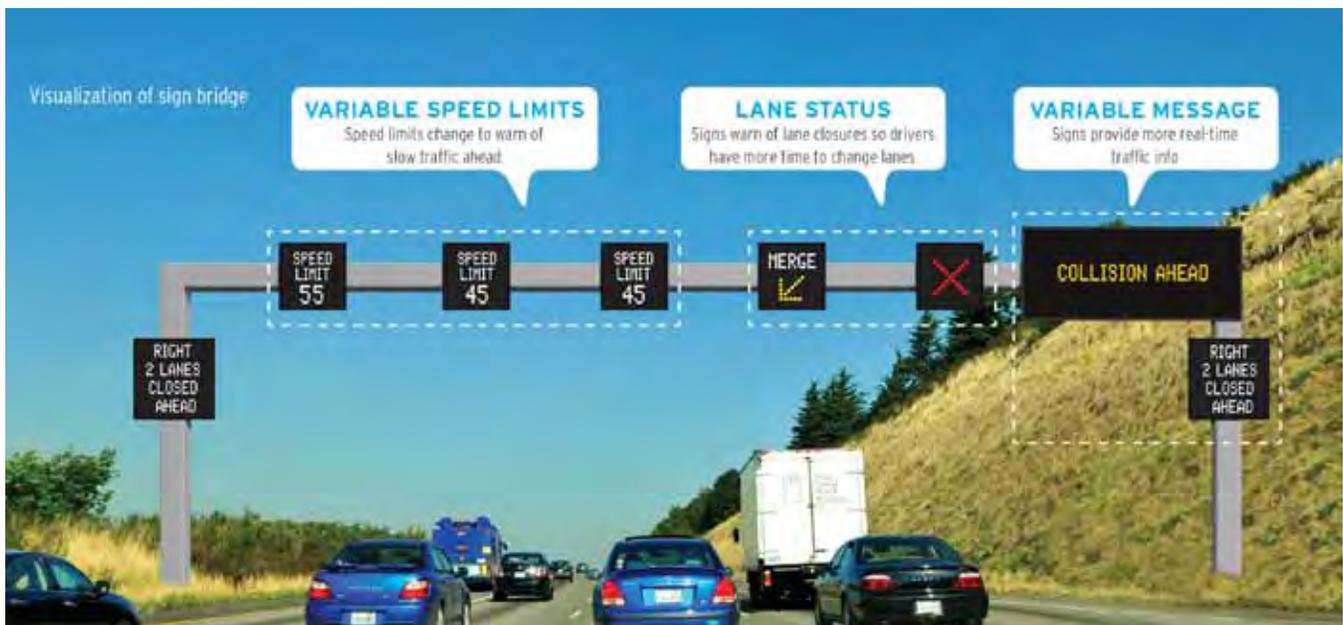
### Background

Variable Speed Limits/Lane Control System is a new technology which uses real-time information to change speed limits and inform drivers of upcoming travel conditions. The system adjusts the legal speed limit, opens and closes lanes, and advises drivers if they need to merge or prepare for congestion.

The purpose of the variable speed limits is to reduce collisions and improve traffic flow. In Europe, this technology has resulted in a 30% reduction in collisions and a 20% increase in roadway capacity.

### Description

Variable Speed Limits and Lane Status signs will be placed over each lane at intervals of approximately every one half mile in both directions between Bellevue and Issaquah. Traffic sensors along the roadway will collect vehicle speeds, congestion information and traffic flow rates. When traffic conditions will benefit from lower speed limits, the computer analog will lower speeds incrementally to gradually reduce the approaching flow of traffic to a congested area. The system can also let drivers know when they need to merge, indicated with a yellow arrow, or with a red X if a lane is closed. Additional information about the congestion ahead will be provided to drivers on a variable message sign.



**Exhibit 6.5:** Visualization of the Variable Speed Limit/Lane Control System

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**Benefit**

The Variable Speed Limits and Lane Control System will help reduce backups and stop-and-go traffic. By creating a slower yet consistent flow of traffic and providing drivers with real-time information about traffic conditions ahead, the probability of collisions is reduced because drivers have more time to react to changing road conditions.

**Planning Level Cost Estimate**

\$27 Million (2009 \$)

**Benefit/Cost Ratio:** n/a

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## Proposed Improvement 3:

### I-90/WB W Lake Sammamish Parkway to E Sunset Way Peak Use Shoulder Lane MP 14-18

#### Background

Congestion during the morning peak hours often occurs because of the high volume traffic on I-90 going to I-405 or West Lake Sammamish Parkway; space is limited on the off-ramps. Traffic regularly backs up on the off-ramps and queues onto the mainline. The average speed between I-405 and Eastgate Way can dip to below 30 mph. The ripple effect extends almost to Front Street in Issaquah.



*West Lake Sammamish Parkway looking west*

As seen in the speed profile under the No Action scenario (Appendix H), heavy congestion will spread for up to two hours in the morning between SR 900 and Highland Drive/Sunset Interchange (Issaquah) and again around West Lake Sammamish Parkway (Bellevue). Congestion starts around SR 900 and spills back to Highland Drive/Sunset Interchange (Issaquah) because of high volumes merging onto I-90. In addition the general purpose lane becomes an HOV lane just west of SR 900.

#### Description

To help reduce congestion during peak traffic hours, WB I-90 will be re-striped to 4 - 11' lanes and create a 14' outside peak use shoulder lane. This project includes resurfacing and re-striping, noise walls, signing, ATM System, traffic control and other work.

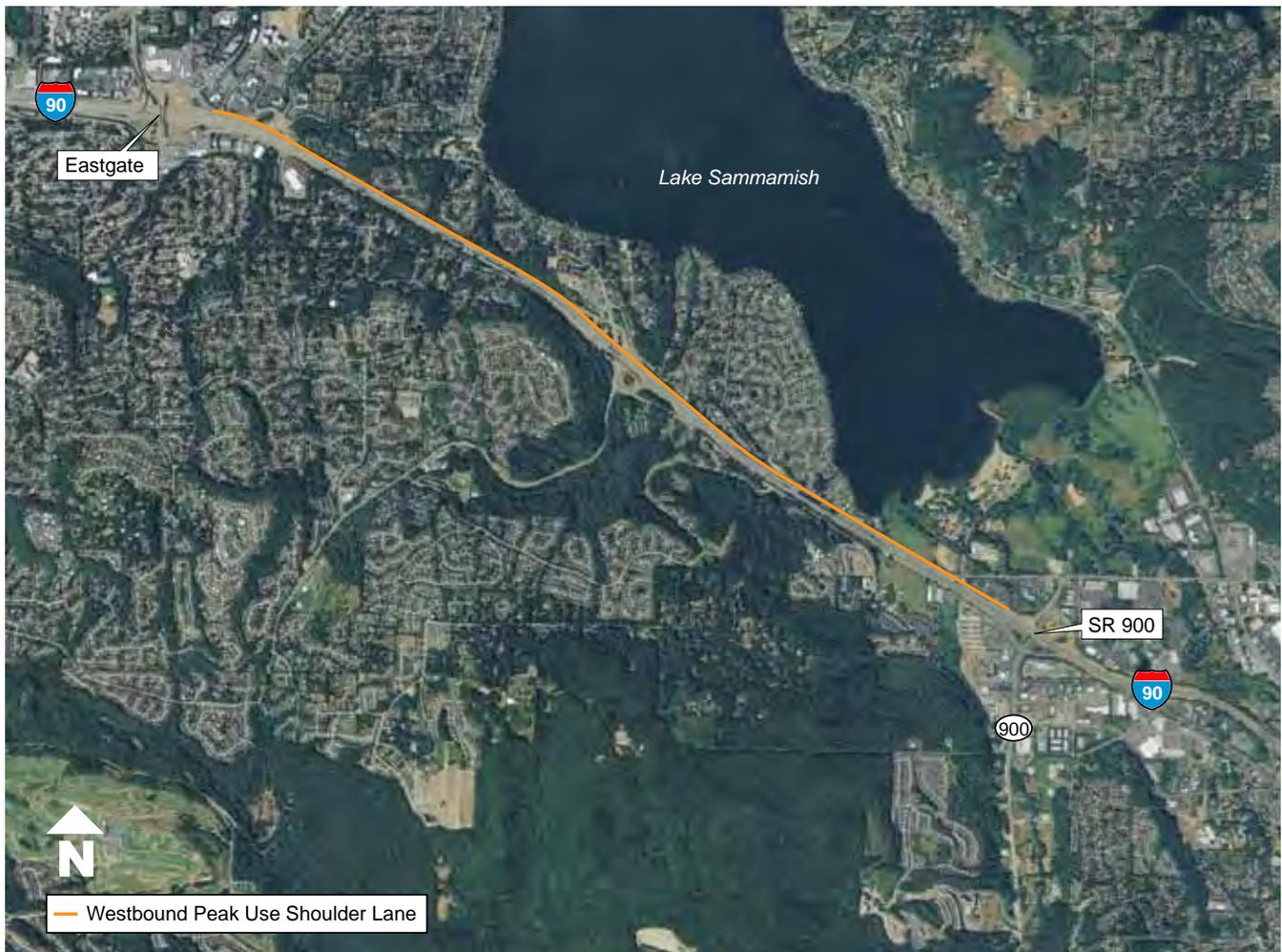
## Benefit

After construction, the Westbound Peak Use Shoulder Lane will provide drivers with additional space to get on and off I-90 more efficiently, reducing the impact to the mainline speeds. After the improvement, the westbound peak use shoulder lane will reduce travel times by up to seven minutes in the morning peak in the general purpose lanes compared to 2005. However, some congestion will remain around Front Street, Eastgate Way and I-405.

## Planning Level Cost Estimate

\$ 61 Million (2011 \$)

**Benefit/Cost Ratio: 1**



**Exhibit 6.6:** Westbound Peak Use Shoulder Lane

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## **Proposed Improvement 4:**

### **I-90/EB Eastgate to W Lake Sammamish Parkway Peak Use Shoulder Lane MP 12-14**

#### **Background**

Congestion on the eastbound mainline near the Eastgate Way on-ramp during the p.m. peak occurs because a high volume of vehicles have a short distance to merge into the mainline. Nearly 2,000 vehicles (equal to a full lane of traffic) enter the freeway from a three lane metered ramp, and only have approximately 1,000 feet to merge with traffic on the mainline. By 2015, the high volume of traffic and short distance to merge causes traffic to backup nearly a mile starting at the Eastgate Way on-ramp and extending west to Richards Road.

#### **Description**

To help reduce congestion during peak traffic hours, EB I-90 will be re-striped to 4 - 11' lanes and create a 14' outside peak use shoulder lane. The project also includes a new onramp connection from the CD lane, just east of the Eastgate interchange. The CD lane will merge into the peak use shoulder lane. This project includes resurfacing and re-striping, noise walls, signing, ATM System, traffic control and other work.

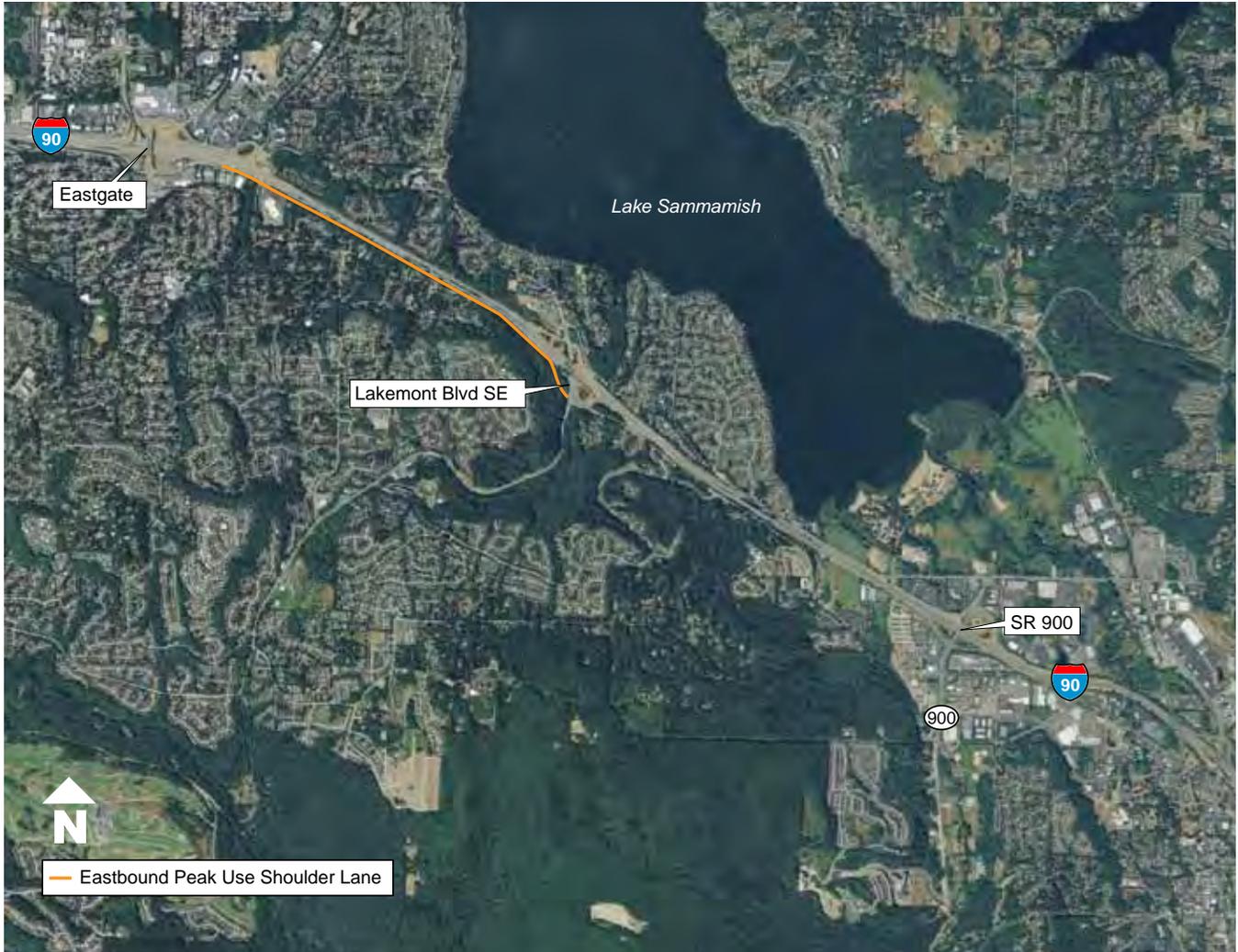
#### **Benefit**

After construction, corridor speeds will exceed 55 mph for the three hour evening peak period. This proposed improvement will also reduce travel times up to three minutes over 2005 conditions. After this improvement, backups onto Bellevue city streets will be significantly reduced.

#### **Planning Level Cost Estimate**

\$44 Million (2011 \$)

#### **Benefit/Cost Ratio: 1**



**Exhibit 6.7:** Eastbound Peak Use Shoulder Lane

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## **Proposed Improvement 5:**

### **Eastgate Way Rechannelization 150th Avenue SE and SE 37th Street Rechannelization and Signal Improvements MP 12**

#### **Background**

By 2030 under the No Action scenario, drivers will experience 100 seconds or more of delay (LOS F) along 150th Avenue SE at two intersections that provide access on and off of I-90: 150th Avenue SE/37th Street and 150th Avenue SE/SE 38th Street.

#### **Description**

Add a lane on 150th SE across I-90, widen the eastbound right turn lane and provide a dual westbound left-turn lane. The study's analyses assumed that two city of Bellevue's improvements are implemented: Transportation Facilities Plan (TFP) 162 and 195.

- TFP 162: widens the I-90 westbound off-ramp at 156th Avenue SE and SE Eastgate . Provides dedicated two left-turn lanes and a shared through/right lane with a channelized right turn lane.
- TFP 195: widens the I-90 off-ramp 300 feet west of 150th Avenue SE and adds a through lane. Widens SE 37th Street approximately 500 feet to the east of 150th Avenue SE allowing for a bypass lane on the right side of the street.

#### **Benefit**

The combination of the improvements described here, including the city of Bellevue's improvements (TFP 162 & TFP 195), will improve the intersection performance from LOS E to LOS D in the a.m. peak hour and from LOS F to LOS D in the p.m. peak. In addition, queues on the I-90 off-ramp will be contained on the ramp; spillbacks onto the mainline will be reduced or eliminated. Drivers will experience significantly less delay at the intersection in the evening peak hour.

#### **Planning Level Cost Estimate**

\$5 Million (2009 \$)

**Benefit/Cost Ratio: 6**



**Exhibit 6.8:** Eastgate Rechanelization

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## Proposed Improvement 6:

### West Lake Sammamish Parkway SE Roundabout MP 14

#### Background

West Lake Sammamish Parkway SE is a two lane north/south arterial that runs along the west side of Lake Sammamish connecting Redmond and Bellevue as well as providing access to and from growing residential neighborhoods and employment. Peak volumes are directional: north in the morning and south in the evening.

Because traffic on West Lake Sammamish Parkway SE adversely affected the performance of the I-90 on and off ramps, in 2002 WSDOT constructed a single lane roundabout on West Lake Sammamish Parkway SE approximately 300 feet from the I-90 on & off-ramps.

#### Description

Widen the existing one-lane roundabout to a two-lane roundabout to accommodate the anticipated traffic growth by 2030.

#### Benefit

Morning and evening peak hour LOS will improve from LOS F to B. The nearly mile long southbound queue in the p.m. peak hour will be significantly reduced. Drivers will experience limited delay at the round-about in the during the evening peak hour.

#### Planning Level Cost Estimate

\$4.1 Million (2009 \$)

**Benefit/Cost Ratio:** 13

#### Roundabouts

**Increased Safety:** Roundabouts have been shown to reduce fatal and injury accidents because of slower speeds and reduced number of conflict points. There are no lights to beat.

**Increased Capacity and reduced delay:** Roundabouts promote a continuous flow of traffic yielding and not coming to a complete stop.

**Reduce Maintenance Cost:** roundabouts reduce or eliminate hardware, maintenance, and electrical costs associated with traffic signals and are functional during power outages.

**Reduced Delay:** By yielding at the entry rather than stopping and waiting for a green light, delay is significantly reduced.

**Reduced air pollution and fuel consumption:** Vehicles yield instead of stop and idle.



**Exhibit 6.9:** West Lake Sammamish Parkway SE Roundabout

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## **Proposed Improvement 7:**

### **Lakemont Off-Ramp Modification MP 14**

#### **Background**

The existing I-90 eastbound off-ramp that intersects with Lakemont Boulevard SE is an unsignalized ramp. Because of the high volumes projected by 2030 on southbound Lakemont Boulevard SE, there will be insufficient gaps in traffic to allow for right turns during the p.m. peak period.

The existing off-ramp has limited capacity for queuing, and because of topography it also has a limited ability to expand. Providing a signal at the I-90 off-ramp terminal was considered but eliminated from further consideration because a signal would cause a queue and breakdown the existing and future roundabouts on West Lake Sammamish Parkway SE.

#### **Description**

Modify the existing eastbound off-ramp loop by adding an additional exit point and moving the existing signal to SE Newport Way.

#### **Benefit**

Operations at the eastbound off-ramp will improve from a LOS F to LOS B. Drivers making a right turn on to Lakemont Boulevard will not experience delay at the ramp terminal during the evening peak hour.

#### **Planning Level Cost Estimate**

\$3 Million (2009 \$)

**Benefit/Cost Ratio: 6**



**Exhibit 6.10:** Lakemont eastbound off-ramp – add additional exit ramp on existing off-ramp

**Exhibit 6.11: 2030 AM & PM Peak Hour Intersection Operations Comparison Summary, No Action and Action**

<b>2030 No Action</b>					
<b>Intersection</b>	<b>Control</b>	<b>AM Peak</b>		<b>PM Peak</b>	
		<b>LOS</b>	<b>Delay (seconds)</b>	<b>LOS</b>	<b>Delay (seconds)</b>
<b>Improvements 6 &amp; 7</b>					
Lakemont Blvd SE/SE Newport Way	Signal	D	39	<b>F</b>	<b>&gt;100</b>
I-90 EB On-Ramp/SE Newport Way	Signal	D	39	A	0
Lakemont Blvd SE/I-90 EB Off-Ramp	OWSC	B	12	<b>F</b>	<b>82</b>
Lakemont Boulevard SE/I-90 WB Ramps	OWSC	<b>F</b>	<b>&gt;100</b>	<b>F</b>	<b>&gt;100</b>
Lakemont Boulevard SE/SE 43rd PL/ W Lake Sammamish Parkway SE	RAB	D	45	<b>F</b>	<b>99</b>
<b>2030 Action</b>					
<b>Intersection</b>	<b>Control</b>	<b>AM Peak</b>		<b>PM Peak</b>	
		<b>LOS</b>	<b>Delay (seconds)</b>	<b>LOS</b>	<b>Delay (seconds)</b>
<b>Improvements 6 &amp; 7</b>					
Lakemont Blvd SE/SE Newport Way	Signal	D	51	E	76
I-90 EB On-Ramp/SE Newport Way	Signal	C	25	B	15
Lakemont Blvd SE/I-90 EB Off-Ramp	OWSC	B	11	C	24
Lakemont Boulevard SE/I-90 WB Ramps	RAB	B	12	B	10
Lakemont Boulevard SE/SE 43rd PL/ W Lake Sammamish Parkway SE	RAB	B	12	A	8

Notes:

OWSC – One-way stop controlled intersection

RAB – roundabout

Data source: I-90 Bellevue to North Bend Corridor Study, Draft Transportation Analysis Technical Memorandum-Future Conditions, CH2MHill, July 2009 and additional technical analysis by CH2MHill in 2010.

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## **Proposed Improvement 8**

### **MP 17**

Two variations for providing an additional I-90 crossing in the vicinity of 11th/12th Avenue NW were evaluated: the extension of 11th/12th Avenue NW without Direct Access Ramp and the extension of 11th/12th Avenue NW with Direct Access Ramps into the existing HOV lane.

#### **Proposed Improvement 8a:**

#### **11th/12th Avenue NW Overcrossing w/o Direct Access Ramp**

#### **MP 17**

##### **Background**

This proposed improvement is of special interest to Issaquah citizens. In December 2011, the Issaquah City Council unanimously approved an agreement with Rowley Properties, Inc. that will guide the redevelopment of 80 acres (located in the southwest and southeast quadrant of the I-90/SR900 interchange area) the into mixed-used neighborhoods.

[www.ci.issaquah.wa.us/page.asp?navid=1597](http://www.ci.issaquah.wa.us/page.asp?navid=1597) During an extensive public outreach process for the Central Issaquah Plan, the community identified the need for an additional multimodal crossing of I-90 near the Rowley development. Currently, there are only three roads that cross I-90 in the downtown area of Issaquah: SR 900, Front Street, and the I-90 Undercrossing (the Undercrossing connects north Issaquah to downtown at 4th Avenue NW). The SR 900 and Front Street crossings provide access to and from I-90 as well as to the local street network. Both of these crossings are congested most of the day. WSDOT and the Federal Highway Administration require an Interchange Justification Report (IJR) for modifications to access on the Interstate system.

##### **Description (Overcrossing without Direct Access)**

A new four lane bridge will be constructed east of SR 900 in the vicinity of 11th/12th Avenue NW. The bridge includes two lanes in each direction, sidewalks and a bike lane. The overcrossing will connect the existing city streets on both sides of the freeway by providing a link over I-90.

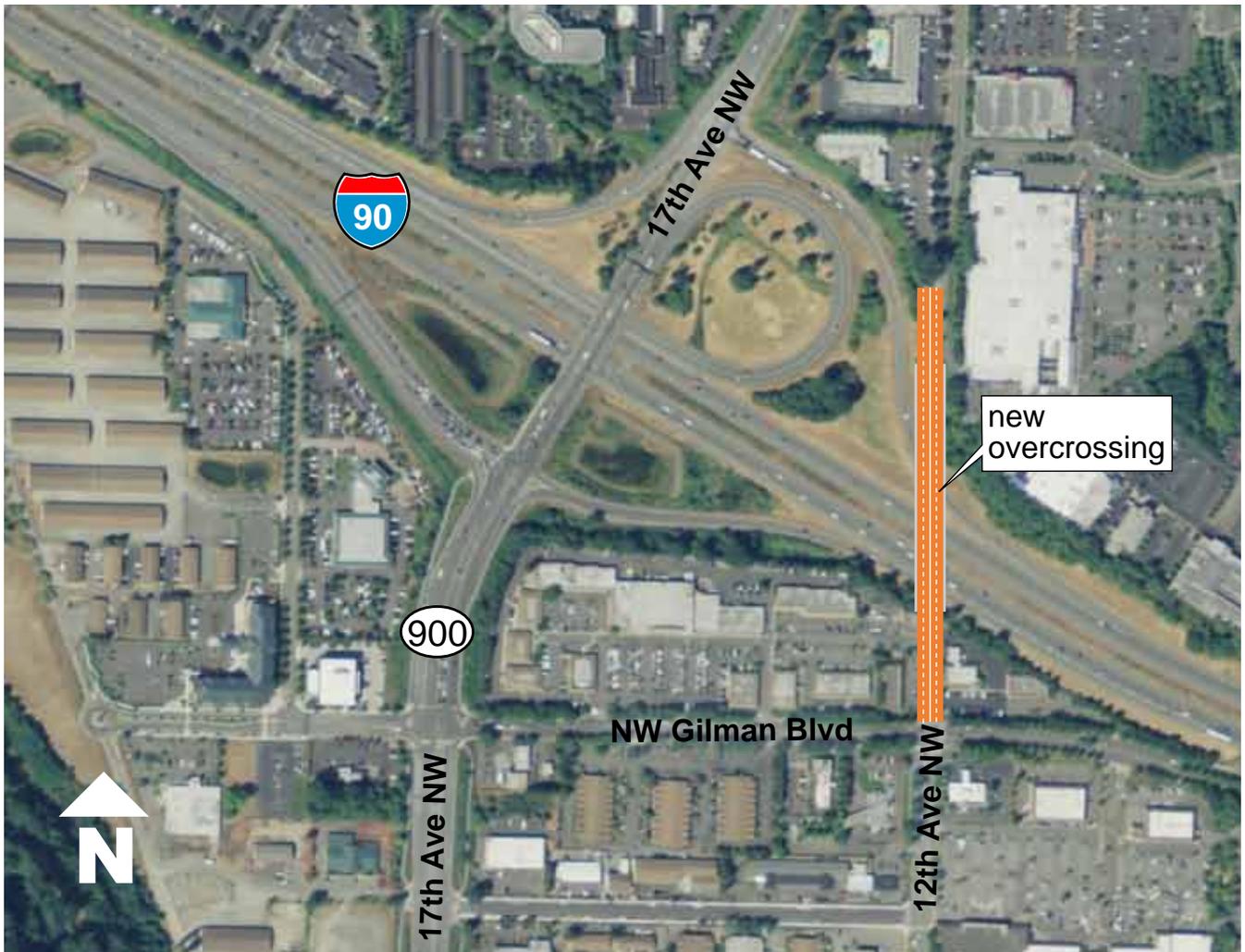
##### **Benefit**

Users will have another option for crossing I-90 in Issaquah. The additional I-90 crossing will reduce congestion around the Front Street and SR 900 Interchanges. It will also increase the local circulation network which serves multimodal trips not destined to I-90.

##### **Planning Level Cost Estimate**

\$48 Million (2009 \$)

##### **Benefit/Cost Ratio: 2**



**Exhibit 6.12:** 11/12th Overcrossing

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**Proposed Improvement 8b:  
11th/12th Avenue NW Overcrossing with Direct Access Ramps  
MP 17**

**Description**

This proposed improvement will construct a five lane overpass with two lanes in each direction. The proposal includes one northbound left-turn lane in each direction, a five-foot bike lane, and a sidewalk. It will also include ramps leading to and from the HOV/HOT lane system.

WSDOT and the Federal Highway Administration require an IJR for modifications to access on the Interstate system.

**Benefit**

- The overcrossing relieves congestion near the SR 900 and Front Street Interchanges by diverting local trips away from I-90 ramps.
- It reduces the weaving of transit & car/vanpools across three general purpose lanes to get in and out of the HOV lane.
- The overcrossing improves transit operations and travel time and provides better transit access to the Issaquah Transit Center.

Note: If this improvement moves forward, the design should take into consideration the possibility of future High Capacity Transit in the I-90 right of way.

**Planning Level Cost Estimate**

\$65 Million (2009 \$)

**Benefit/Cost Ratio: 2**



**Exhibit 6.13:** 11th/12th Direct Access Ramp and Overcrossing

## Proposed Improvement 9: Front Street Interchange Reconstruction (Issaquah) MP 17

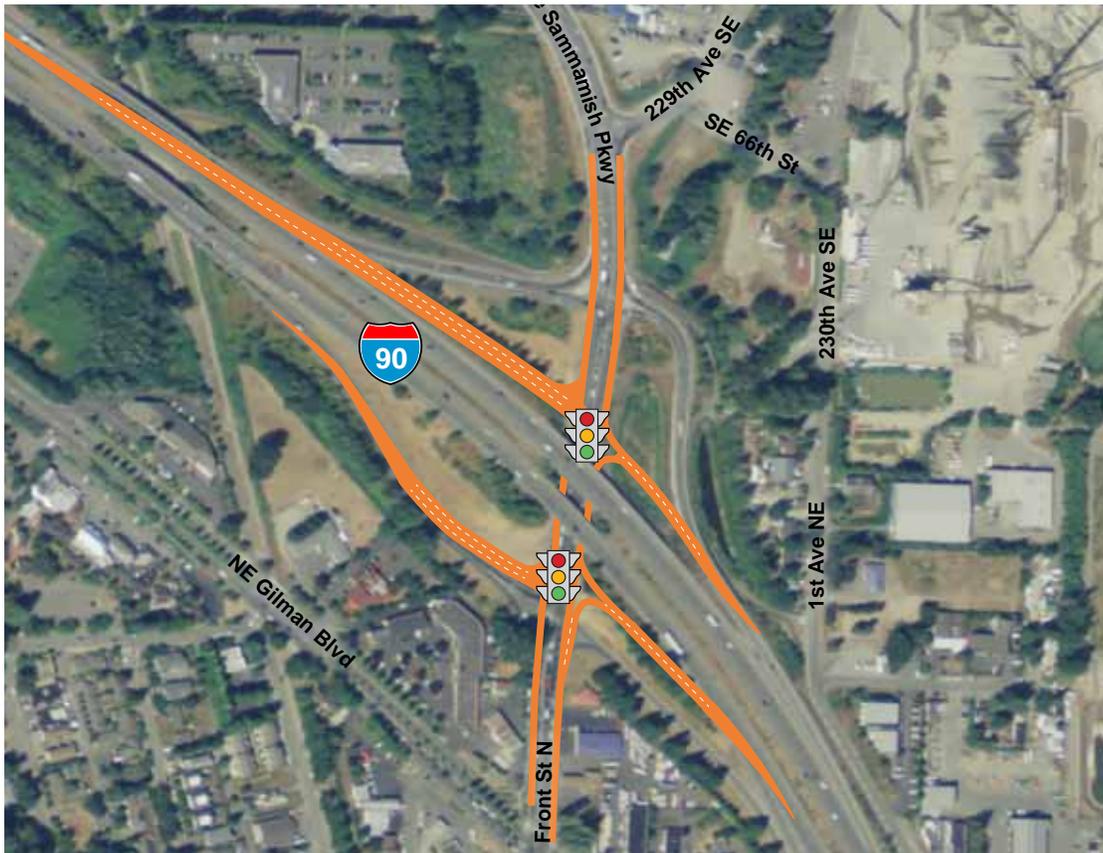
### Background

Stakeholders representing Issaquah identified the reconstruction of the Front Street Interchange as an important issue for them because of current and anticipated congestion at the Front Street Interchange. Representatives from Issaquah expressed interest in analyzing a Single Point Urban Interchange (SPUI). For the purposes of this corridor plan, two concepts were evaluated: a SPUI and a Tight Diamond Interchange (TDI).

The SPUI and TDI concepts should be considered only as a starting point for future analyses and study. WSDOT and the Federal Highway Administration require an IJR for modifications to access on the Interstate system.

### Description

The TDI is similar to traditional Diamond Interchanges where the freeway is grade-separated from a minor road but a TDI includes two closely spaced signals that are typically less than 400 feet apart. In addition to the TDI, dual left turn lanes at the East Lake Sammamish Parkway/Issaquah-Fall City Road intersection would be provided.



**Exhibit 6.14:** TDI concept at Front Street

The SPUI allows left turning traffic from both directions of the intersecting roadways to turn simultaneously without crossing the path of the opposing left turns. In addition to the SPUI, dual left turn lanes at the East Lake Sammamish Parkway/Issaquah-Fall City Road intersection would be provided.



**Exhibit 6.15:** SPUI concept at Front Street

**Planning Level Cost Estimate**

TDI: \$44 Million (2009 \$)

SPUI: \$66 Million (2009 \$)

**TDI Benefit/Cost Ratio: 1**

**SPUI Benefit/Cost Ratio: .7**

**Exhibit 6.16: 2030 AM Peak Hour Intersection Operations Summary, Action and No Action**

Intersection	No Action			Action (TDI)		Action (SPUI)	
	Control	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)
<b>Improvement 9: I-90/Front Street/E Lake Sammamish Pkwy Interchange</b>							
Front Street/ NW Gilman Blvd	Signal	C	31	C	31	C	34
Front Street/ I-90 EB Ramps	Signal	C	22	C	23	n/a*	
Front Street/ I-90 WB Ramps	Signal	C	20	B	16	n/a*	
E Lake Sammamish Pkwy SE/ 229th Avenue SE	Signal	A	3.0	B	12	A	6
E Lake Sammamish Pkwy SE/ Issaquah Fall City Road	Signal	D	55	D	42	D	4
Front Street/SPUI						C	30

\*movement is accomodated with a new configuration

**Exhibit 6.17: 2030 PM Peak Hour Intersection Operations Summary, Action and No Action**

Intersection	No Action			Action (TD)		Action (SPUI)	
	Control	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)
<b>Improvement 9: I-90/Front Street/E Lake Sammamish Pkwy Interchange</b>							
Front Street/ NW Gilman Blvd	Signal	F	84	F	91	F	92
Front Street/ I-90 EB Ramps	Signal	F	87	C	33	n/a*	
Front Street/ I-90 WB Ramps	Signal	B	17	B	18	n/a*	
E Lake Sammamish Pkwy SE/ 229th Avenue SE	Signal	A	3	A	10	A	8
E Lake Sammamish Pkwy SE/Issaquah Fall City Road	Signal	F	91	E	70	E	65
Front Street/SPUI						C	35

\*movement is accomodated with a new configuration

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## Proposed Improvement 10: Preston/Fall City Ramp Traffic Control Improvements Signal or Roundabout MP 23

### Background

The analyses indicate that by 2030 the eastbound off-ramp will experience delay under the No Action scenario and traffic will back up onto the mainline.

### Description

Install a signal or construct a single lane roundabout at the I-90 to SE 82nd Street eastbound ramp. The ramp will likely need to be widened to accommodate the Roundabout or turn lanes. A traffic analysis in the future is recommended to determine if a signal or roundabout is the most appropriate option.

### Benefit

Prevents the eastbound off-ramp from backing up onto the mainline in the future. Both ramp termini is expected to operate at LOS E or F for over four hours a day by 2030 under the No Action scenario. With traffic control the ramp termini are expected to operate at LOS D or better in 2030. With the project, drivers will experience limited delay at the ramp.

### Planning Level Cost Estimate

Roundabout: \$4 Million (2009 \$)

Signal: \$4 Million (2009 \$)

### Roundabout/Signal Benefit/ Cost Ratio: 3

Signal Benefit/Signal Cost Ratio: 3



**Exhibit 6.18:** Eastbound Preston/Fall City off-ramp traffic control

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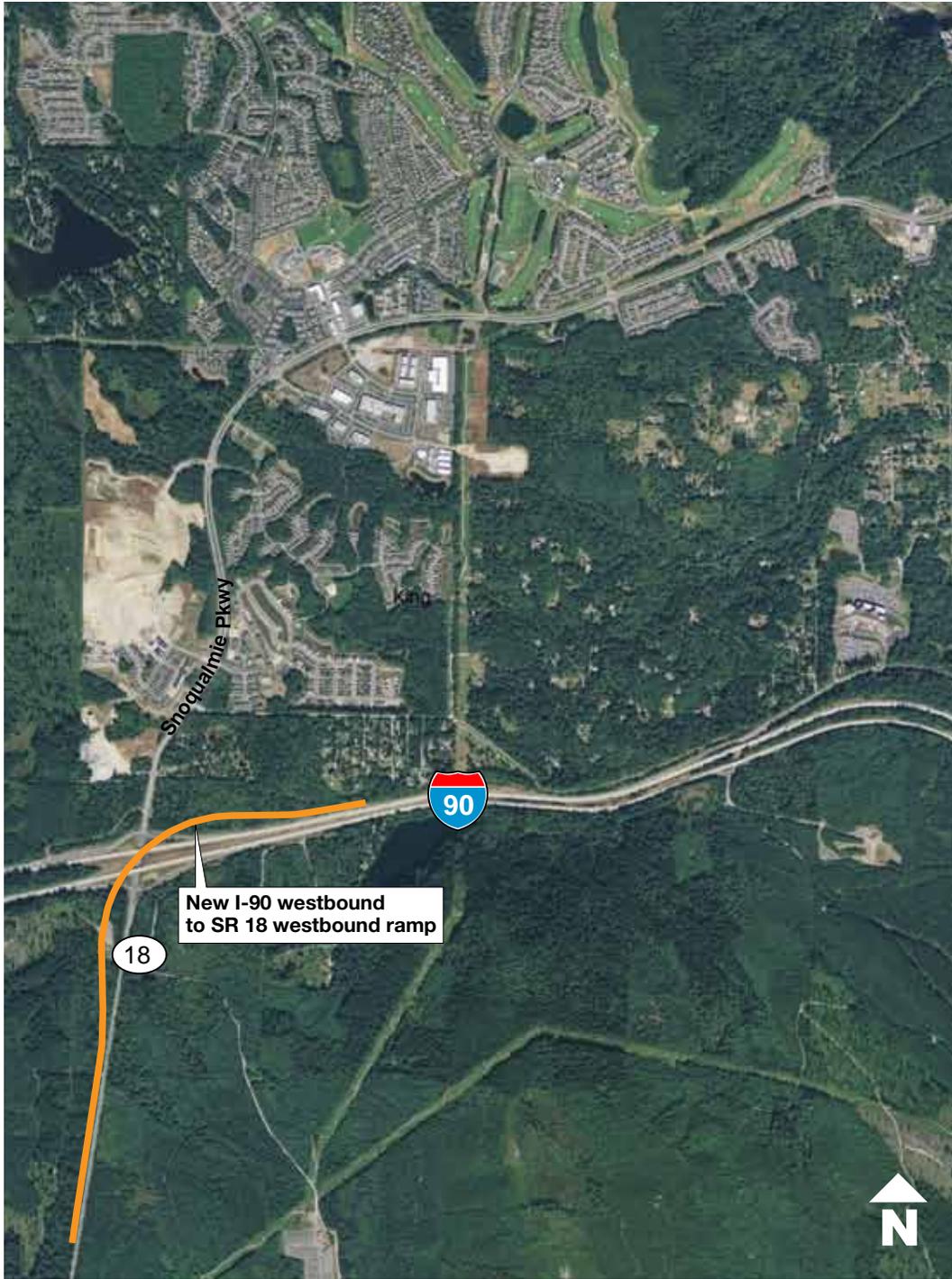
## **Proposed Improvement 11:**

### **I-90/SR18 Variable Speed Limits and Lane Control System (Snoqualmie) MP 25**

#### **Background**

The I-90/SR18 Interchange provides access to the Snoqualmie Ridge development. This development is a large master planned community with mixed uses of signature homes, townhouse, condominiums, apartments and retail.

WSDOT is developing plans to widen SR 18 to two lanes in each direction between the Issaquah/Hobart Road and I-90, and rebuild the I-90/SR18 interchange. WSDOT is currently conducting an Interchange Justification Report for the first phase of the I-90/SR18 interchange reconstruction. The project would construct a dedicated westbound I-90 to westbound SR 18 ramp. The project is currently unfunded and is estimated to cost \$65 million (2010 \$). The Variable Speed Limits and Lane Control System is intended to be a near term improvement to maximize existing capacity.



**Exhibit 6.19:** Snoqualmie Ridge Community and current proposed I-90/SR 18 interchange westbound I-90 to westbound SR 18 on-ramp

## Description

Variable Speed Limits and Lane Status signs will be placed over each lane at intervals of approximately every half mile in both directions through the interchange area. Traffic sensors along the roadway will collect vehicle speeds, congestion information and traffic flow rates. When traffic conditions will benefit from lower speed limits, the computer analogue will lower speeds incrementally to gradually reduce the approaching flow of traffic to a congested area. The system can also let drivers know when they need to merge, indicated with a yellow arrow, or with a red X if a lane is closed. Additional information about the congestion ahead will be provided to drivers on a variable message sign.

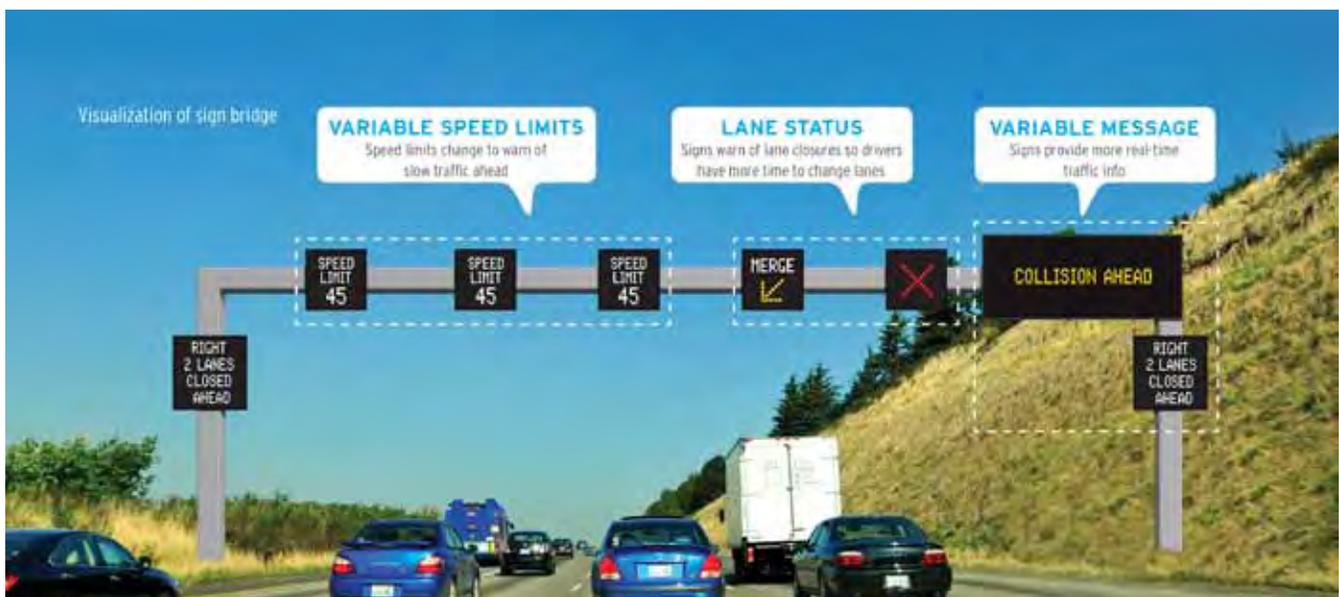
## Benefit

During the peak periods, queues often form on the off-ramps spilling onto the mainline. The mainline speed limit is 70 mph and is posted on a static sign. As a result there are large speed differentials between the mainline and vehicles that are backed up on the mainline. The Variable Speed Limits and Lane Control System will adjust the speed limit to reduce the speed differential and alert drivers of real time traffic conditions ahead. Drivers will have more time to prepare for traffic conditions that will reduce the probability of collisions.

## Planning Level Cost Estimate

\$8 Million (2009 \$)

**Benefit/Cost Ratio: 1**



**Exhibit 6.20:** Visualization of Variable Speed Limit/Lane Control System

## Proposed Improvement 12:

### North Bend 436th Avenue Interchange Traffic Control (Signals or Roundabouts at Ramp Terminals) MP 32

#### Background

The ramps are currently controlled with stop signs; as traffic volumes grow in the future, delays will increase. Three of the four interchange ramps are predicted to operate at LOS F in the p.m. peak by 2030 under the No Action scenario.

#### Description

Install either two traffic signals or construct two single lane roundabouts at the ramp terminals.

#### Benefit

Improves LOS in the p.m. peak from F to B and reduces queuing on the ramps. Drivers will experience limited delay at the ramp terminal in the evening peak hour.

#### Planning Level Cost Estimate

Roundabouts: \$2 Million each (2009 \$)

Signals: \$3 Million each (2009 \$)

**Roundabout Benefit/Cost Ratio: 10**

**Signal Benefit/Cost Ratio: 15**



**Exhibit 6.21:** Traffic Control 436th Ave

## Comparison of 2030 Operations at I-90/436th Avenue SE Interchange with No Action and Action

Exhibits 6.22 and 6.23 show the future traffic conditions with and without signal improvements in terms of Level-of-Service and delay for the a.m. and p.m. peak hours for the eastbound and westbound ramps.

### Exhibit 6.22: 2030 AM Peak Hour Intersection Operations Summary, Action and No Action

Intersection	No Action			Action – Signal		Action – RAB	
	Control	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)
<b>Improvement 12: I-90/436th Avenue SE Interchange</b>							
436th Avenue SE/ I-90 EB Ramps	OWSC	C	18	B	13	A	3.5
436th Avenue SE/ I-90 WB Ramps	OWSC	D	34	A	5	A	7.2

Notes:

OWSC – One-way stop controlled intersection

### Exhibit 6.23: 2030 PM Peak Hour Intersection Operations Summary, Action and No Action

Intersection	No Action			Action – Signal		Action – RAB	
	Control	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)
<b>Improvement 12: I-90/436th Avenue SE Interchange</b>							
436th Avenue SE/ I-90 EB Ramps	OWSC	F	>100	B	15	A	8.9
436th Avenue SE/ I-90 WB Ramps	OWSC	F	55	B	10	A	5.6

Notes:

OWSC – One-way stop controlled intersection

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## I-90 Benefit/Cost Analyses of Proposed Improvements

Benefit/Cost analyses (B/C) are used to help determine whether a proposed improvement, project, program or policy is worth doing, or is used to choose between several alternatives. A B/C analysis involves comparing the total expected costs of each option against the total expected benefits, to see whether the benefits outweigh the costs, and by how much. An improvement with a B/C ratio greater than 1.0 indicates that the benefits of a project outweigh the costs of a project. A project with a B/C ratio of less than 1.0 indicates that the cost of the project outweigh the benefits of the project.

**Given prevailing economic conditions, the revenue from state resources needed to implement these improvement recommendations are either limited or non-existent. This study does not guarantee funding for the proposed improvement recommendations. The improvement recommendations in this study will need to compete with other similar proposed improvements around the state for future funding based on performance outcome. Partner agencies can use the list of improvement recommendations in this corridor study to solicit funding from local, state, federal sources, and the private sector to fund project design, environmental review, right-of-way acquisition, and construction.**

The B/C analysis and cost estimate for the proposed improvements are shown below in Exhibits 6.24 and 6.25.

**Exhibit 6.24: Year 2015 I-90 Corridor Improvement Recommendations**

Cost	Improvement	Improvement No.	Estimated Cost	B/C Ratio
Low	ATM/ITS at I-90/SR 18 I/C - Snoqualmie	11	\$8,000,000	1
Medium	WB & EB HOV to HOT Lane Conversion	1	\$19,000,000	2
	ATM (traveler info, variable message signs, ramp meters, integrated ramp signals)	2	\$27,000,000	1
High	EB Peak Use Shoulder Lane	4	\$44,000,000	1

**Exhibit 6.25: Year 2030 I-90 Corridor Improvement Recommendations**

Cost	Improvement	Improvement No.	Estimated Cost	B/C Ratio
Low	Eastgate Rechannelization – Bellevue	5	\$5,000,000	6
	W Lake Samm Pkwy Phase 1 – Widen Existing Roundabout	6-1	\$4,100,000	14
	Lakemont Off-Ramp Modification	7	\$2,300,000	6
	Preston-Fall City I/C Signal or Roundabout	10	\$4,000,000	3
	N Bend 436th Avenue Signals	12-1	\$2,500,000	15
	N Bend 436th Avenue Roundabouts	12-2	\$4,000,000	10
High	WB Peak Use Shoulder Lane	3	\$61,000,000	1
	11th/12th Ave. NW-Issq-Overcrossing – no DAR	8-1	\$48,000,000	2
	11th/12th Ave. NW-Issq-Overcrossing with DAR	8-2	\$63,000,000	2
	Front St. Tight Diamond Urban I/C	9	\$44,000,000 - \$66,000,000	1

**Exhibit 6.26: I-90 Improvements Proposed Programming Matrix, 20 years**

I-90 Improvements Proposed Programming Matrix						
	Project Number		w/in 6 years	w/in 12 years	w/in 20 years	20+ years
<b>Proposed Improvements Recommended by I-90 Corridor Planning Study</b>						
 <p><b>Operate Efficiently and Manage Demand</b></p>	1	Convert HOV to HOT (both directions)	√			
 <p><b>Operate Efficiently</b></p>	2	<b>Active Traffic Management (ATM)</b> Variable Speed Zone and Lane Control Eastgate to Sunset	√			
	5	<b>Eastgate I/C Rechannelization</b>			√	
	7	<b>Lakemont Off-Ramp Modification</b>				√
	9	<b>Front Street Interchange Reconstruction<sup>1</sup></b>				√
	10	<b>Preston-Fall City Ramp Traffic Control<sup>2</sup></b>			√	
	11	<b>Active Traffic Management</b> Variable Speed Zone and Lane Control I-90/SR 18 Interchange	√			
	12	<b>436th Avenue SE Traffic Control<sup>2</sup></b> Signals or Roundabouts			√	
 <p><b>Add Capacity Strategically</b></p>	3	<b>I-90/WB W Lake Sammamish Parkway to E Sunset Way</b> Peak Use Shoulder Lane			√	
	4	<b>I-90/EB Eastgate to W Lake Sammamish Parkway</b> Peak Use Shoulder Lane		√		
	6	<b>West Lake Sammamish Roundabout</b> (widen existing)			√	
	8	<b>8a. 11th/12th Avenue NW Overcrossing w/o Direct Access Ramp<sup>1</sup></b>			√	
		<b>8b. 11th/12th Avenue NW Overcrossing Direct Access Ramps<sup>1</sup></b>				√
<sup>1</sup> Needs further study including an IJR <sup>2</sup> Signal or roundabout to be determined in the future						

# Plan Implementation

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## 7.1 Plan Implementation

With prevailing economic conditions, the available state and federal revenue needed to implement these improvements is very limited and cannot fund all of the projects in the near term. These improvements will have to compete with similar projects for limited statewide funding.

To assist with the implementation of the improvements, a proposed programming matrix was developed by the project team based on the guidelines outlined in WSDOT's 2007 Planning Studies Guidelines and Criteria Report. This proposed programming matrix, as presented in Table 7.1, lists the projects by their priority and classifies them in terms of the Washington Transportation Guidelines and the Highway System Plan implementation strategies.

The projects range from \$1.6 million to \$61 million dollars to construct. The proposed improvement projects were evaluated based on preservation, maintenance, safety, traffic impacts, constructability, and environmental red flags. Input from the public, stakeholders, and agencies was also taken into consideration during the prioritization process.

The proposed programming matrix lists the proposed improvements for I-90 on the previous page. The matrix shows when the proposed projects should logically be implemented in the first six years, the second six years, the last eight years, and those beyond twenty years.

**Exhibit 7.I: I-90 Improvements Proposed Programming Matrix, 20+ years**

<b>I-90 Improvements Proposed Programming Matrix</b>							
	<b>Tier*</b>	<b>Project Number</b>		<b>w/in 6 years</b>	<b>w/in 12 years</b>	<b>w/in 20 years</b>	<b>20+ years</b>
<b>Existing Safety Projects</b>							
 <b>Keep Safe</b>		<b>A</b>	Eastgate Interchange Area (signage & guardrail)	√			
		<b>C</b>	I-90 ramps/West Lake Sammamish (new roundabout)	√			
		<b>D</b>	Preston-Fall City Interchange (guardrail)	√			
<b>Existing Preservation Projects</b>							
 <b>Maintain</b>		<b>B</b>	Bridge Seismic Retrofit (Bellevue to Issaquah)	√			
		<b>E</b>	I-90/WB SR 18 Bridge Deck Rehab	√			
<b>Proposed Improvements Recommended by I-90 Corridor Planning Study</b>							
 <b>Operate Efficiently and Manage Demand</b>	<b>Tier III</b>	<b>1</b>	<b>Convert HOV to HOT (both directions)</b>	√			

\*See page 46 for description of Tiers

**Exhibit 7.I: I-90 Improvements Proposed Programming Matrix 20+ years (continued)**

I-90 Improvements Proposed Programming Matrix							
	Tier*	Project Number		w/in 6 years	w/in 12 years	w/in 20 years	20+ years
<b>Proposed Improvements Recommended by I-90 Corridor Planning Study</b>							
 <p><b>Operate Efficiently</b></p>	Tier II	2	<b>Active Traffic Management (ATM)</b> Variable Speed Zone and Lane Control Eastgate to Sunset	√			
	Tier II	5	<b>Eastgate I/C Rechannelization</b>			√	
	Tier II	7	<b>Lakemont Off-Ramp Modification</b>				√
	Tier III	9	<b>Front Street Interchange Reconstruction<sup>1</sup></b>				√
	Tier III	10	<b>Preston-Fall City Ramp Traffic Control<sup>2</sup></b>			√	
	Tier I	11	<b>Active Traffic Management</b> Variable Speed Zone and Lane Control I-90/SR 18 Interchange	√			
	Tier II	12	<b>436th Avenue SE Traffic Control<sup>2</sup></b> Signals or Roundabouts			√	
<b>Proposed Improvements Recommended by I-90 Corridor Planning Study</b>							
 <p><b>Add Capacity Strategically</b></p>	Tier II	3	<b>I-90/WB W Lake Sammamish Parkway to E Sunset Way</b> Peak Use Shoulder Lane			√	
	Tier II	4	<b>I-90/EB Eastgate to W Lake Sammamish Parkway</b> Peak Use Shoulder Lane		√		
	Tier II	6	<b>West Lake Sammamish Roundabout</b> (widen existing)			√	
	Tier III	8	<b>8a. 11th/12th Avenue NW Overcrossing w/o Direct Access Ramp<sup>1</sup></b>			√	
	Tier III		<b>8b. 11th/12th Avenue NW Overcrossing Direct Access Ramps<sup>1</sup></b>				√
			<sup>1</sup> Needs further study including an IJR				
			<sup>2</sup> Signal or roundabout to be determined in the future				

\*See page 55 for description of Tiers

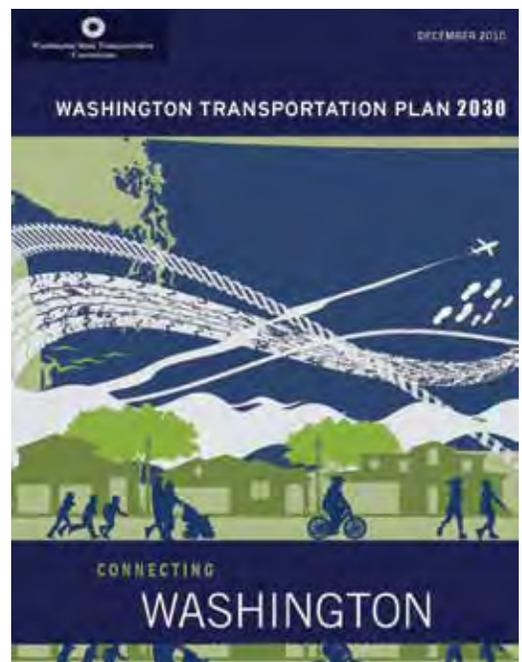
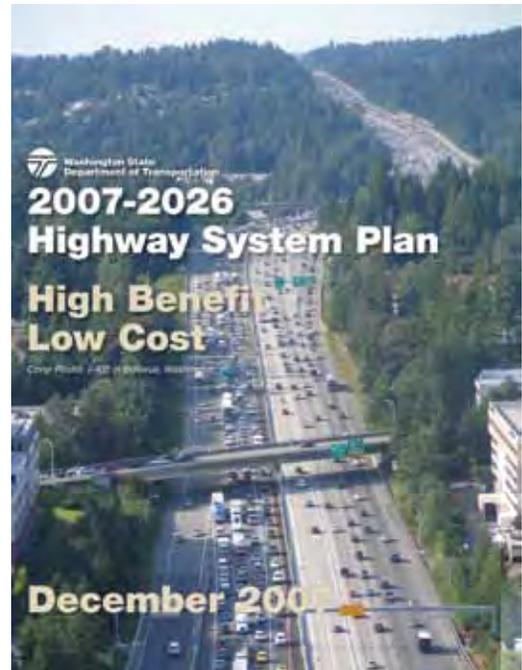
## 7.2 Highway System Plan

The Washington State Highway System Plan (HSP) is the state highway component of the Washington State Multimodal Transportation Plan (SMTP). The SMTP is the state's overall transportation plan that includes an analysis of facilities the state owns and those in which the state has an interest. The HSP is updated every two years and serves as the basis for the six-year highway program and the two-year biennial budget request to the Washington State Legislature. The current HSP was completed in 2007 (minor updates in 2009) and covers the years 2007 to 2026. The HSP is also aligned to the WTP, which outlines the policies adopted by the Washington State Transportation Commission.

## 7.3 Washington State Transportation Plan

In 2007, the Washington State Legislature and the Governor created five investment policies for planning, operations, performance, and investment in the state's transportation system as outlined in RCW 47.04.280 (derived from Senate Bill 5412). This overarching transportation plan for the state is known as the Washington Transportation Plan (WTP). It is developed by the Washington State Transportation Commission and provides a 20-year blueprint for transportation programs and investments. The WTP 2030 covers various modes in the transportation system and is required by state and federal law. The current plan was produced in December 2010 and covers the period from 2010 – 2030.

<http://wtp2030.wordpress.com/2010/12/30/commission-adopts-wtp-2030/>



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A sixth investment policy goal was added by the legislature in 2010. Investment in the state transportation system must support one or more of the following six policy goals:

- **Economic Vitality:** To promote and develop transportation systems that stimulate, support, and enhance the movement of people and goods to ensure a prosperous economy.
- **Preservation:** To maintain, preserve, and extend the life and utility of prior investments in transportation systems and services.
- **Safety:** To provide for and improve the safety and security of transportation customers and the transportation system.
- **Mobility:** To improve the predictable movement of goods and people throughout Washington state.
- **Environment:** To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment.
- **Stewardship:** To continuously improve the quality, effectiveness, and efficiency of the transportation system.

## **Current Funding and Future Funding Needs**

The most recent statewide transportation revenue packages were enacted by the Legislature in 2005. The legislature raised the motor vehicle fuel tax and other fees and charges to support two WSDOT capital programs: the 2003 Nickel Funding Package and the 2005 Transportation Partnership Act Funding Package. Together, these funding packages invested \$15.5 billion in highway, rail, ferry, transit, and freight projects across the state. By the end of March 2012, 325 of 421 projects will be complete or under construction. Future revenues from these two funding packages have been bonded and committed to the 421 projects. WSDOT estimates that basic preservation, safety, and environmental needs for the next twenty years will require an additional \$14.8 billion.

Although WSDOT is in the process of delivering \$15.5 billion dollars worth of investments into state owned transportation facilities, we know that much more is needed. Washington State faces tremendous transportation needs statewide; it is estimated that at least \$175 billion to \$200 billion is needed to meet statewide needs over the next 20 years. To meet these challenges effectively an integrated, systems view of the state's transportation network is required. This systems view recognizes the central role that transportation plays in our economic and social well-being and establishes a policy framework against which projects and investments can be assessed

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and prioritized. At a minimum, the statewide transportation need of transit providers and state, county, and city governments for the 2011–2030 time frame of WTP 2030 is in the range of \$175 to \$200 billion.

Although an estimate, this range is consistent with a constrained 30 year need (\$189 billion) identified in Transportation 2040 adopted by the Puget Sound Regional Council and the 2008 constrained plan developed by the Spokane Regional Transportation Council (\$7.5 billion). Due to the difficulty of identifying needs so far in the future, the Commission asked WSDOT, the Association of Washington Cities, the Washington State Association of Counties, and the Washington State Transit Association to help estimate the statewide 20 year transportation needs. WSDOT estimates the 20 year need for the state transportation system alone is \$63.8 billion.

## 7.4 Regional Plans

Metropolitan Planning Organizations (MPO) and Regional Transportation Planning Organizations (RTPO) have specific responsibilities under both federal and state law relating to transportation and growth management planning. The organization that performs these planning functions within the study area is the Puget Sound Regional Council (PSRC), which is both the MPO and RTPO for Kitsap, King, Pierce, and Snohomish Counties.

Destination 2030 was the transportation plan adopted by PSRC in 2001 and updated in 2007. Transportation 2040, the region's new 30-year transportation plan, was adopted in spring 2010 and replaced Destination 2030. The current regional plan focuses on transportation system investments needed to provide an integrated, multimodal transportation system in Central Puget Sound. For transportation projects to receive federal funding, they must be consistent with and included in these regional transportation plans.

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## 7.5 Local Comprehensive Plans

Partner agencies can incorporate recommendations from this corridor plan into their local transportation plans to show consistency between the corridor plan, state and regional transportation plans, and their comprehensive plans. There are a number of reasons why it is important for the I-90 corridor project recommendations to be incorporated into local agency planning documents, but the two most critical are:

- It demonstrates to funding agencies that the plan has support at state, regional, and local levels

- It addresses a critical requirement under the Growth Management Act, which requires plans to be consistent between and among jurisdictions.

## 7.6 Funding

### **How will we pay for the projects identified in the I-90 Study?**

The I-90 corridor study identifies 12 improvements ranging in total cost between \$1.6 million and \$61 million dollars (2009 planning level cost estimates). None of these projects has been identified for funding under current budgets (state, regional, local).

### **What potential funding sources are available for these projects?**

No state capital improvement funding sources are available for the next six years. Partner agencies can use the list of recommendations in this corridor plan to solicit funding from local, state, and federal sources and the private sector to fund project design, environmental review, right-of-way acquisition, and construction. Improvements for I-90 will have to compete with similar projects on a statewide basis based on performance outcome per dollars spent.

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While WSDOT has been the lead agency in conducting the analysis for this report, it will be incumbent upon local jurisdictions in the project area (King County, Bellevue, Issaquah, Sammamish, Snoqualmie, North Bend) and local transit agencies to secure funding for the preferred improvements.

**Federal Funds** – One of the most common sources of funding for major highway projects is the federal SAFETEA-LU program or the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users. The two landmark bills that brought surface transportation into the 21st century – the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21) – shaped the highway program to meet the nation’s changing transportation needs. SAFETEA-LU built on this firm foundation, supplying the funds and refining the programmatic framework for investments needed to maintain and grow our national transportation infrastructure.

Within SAFETEA-LU, the Surface Transportation Program (STP) provides flexible funding that may be used by states and localities for projects on any federal-aid highway. SAFETEA-LU expired on September 30, 2009 and December 31, 2010, but the U.S. Congress extended it once again to September 30, 2011 until a new program can be implemented. Efforts are currently underway in the Congress, USDOT, and national organizations to help shape the next act.

In addition, the Congestion Mitigation and Air Quality Improvement Program (CMAQ) provides a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act (CAA). While there are many sources of federal grants, including direct legislative “earmarks,” these two are the most commonly used for projects similar to those along the I-90 corridor.

**State Funding** – The state of Washington also administers a number of funding programs that may be used for transportation projects. The most common source of state grant funds for transportation projects is the Transportation Improvement Board (TIB). The Washington State Legislature created the TIB to foster state investment in quality local transportation projects.

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The TIB distributes grant funding, which comes from the revenue generated by three cents of the statewide gas tax, to cities and counties for funding transportation projects. For the I-90 improvements, TIB funds can be used by the incorporated cities to lead selected improvement projects within their jurisdictions, such as intersection improvements or parallel street improvements than can divert traffic from the state highway along the corridor.

**County Road Administration Board** – The County Road Administration Board (CRAB) manages grant programs to help counties meet their transportation needs. The programs are administered with maximum flexibility and minimum overhead.

**Rural Arterial Program (RAP)** – The RAP is a road and bridge reconstruction funding program that counties compete for every two years within their respective regions. Taken from fuel tax revenues, the account generates approximately \$40 million per biennium.

**County Arterial Preservation Program (CAPP)** – The CAPP program is designed to help counties preserve their existing paved arterial road networks. The program generates approximately \$30 million per biennium.

**Local Agency Funding** – To be eligible for and competitive in most grant programs, local matching dollars are required: the more local participants are involved in and support a project, the more competitive a grant application can become. Private funding through developer mitigation payments for impacts to the highway could also be a source of matching funds.

**Development Impact Fees** – The use of development impact fees to fund public facilities that are necessary to provide services for new development and maintain acceptable level-of-service has been widely used in Washington and across the U.S. Development Impact Fees are one-time charges applied to new developments. Their goal is to raise revenue for the construction or expansion of capital facilities located outside the development to maintain an acceptable level-of-service for all users.

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Impact fees are assessed and dedicated principally for the provision of additional water and sewer systems, roads, schools, libraries, parks, and recreational facilities made necessary by the presence of new residents in the area. As new developments are approved, consideration should be given to their impact on the operation of local, county, and state highways within the proximity of the new development.

Much of the congestion along the study corridor is the result of population and job growth associated with local land use decisions. While there may be underlying reasons why measures to mitigate the impacts of development resulting from growth have not been required, a better linkage can be made between local land use decisions and highway congestion. All jurisdictions along the I-90 corridor could, and probably should, enter into effective interlocal agreements with WSDOT to more efficiently assign the costs of traffic mitigation to local development projects.

The recommendations in this study use the Moving Washington principles for making responsible and sustainable decisions. The recommended improvements in this corridor study include lower-cost options, in addition to the long-term roadway investments. The lower cost projects may be implemented faster while still showing some benefit to traffic and safety in the I-90 study area. The next steps for this corridor plan process after the identification of funding sources are to partner with agencies to pursue various funding from local, state, federal, and private sources for improvements recommended in this corridor plan.

The recommendations also reflect WSDOT's commitment to the "triple bottom-line" approach to sustainability by promoting robust economic growth, supporting an integrated multimodal transportation system and environmental stewardship. The recommendations include such sustainability practices as the use of variable speed-limit and lane status signs, proposed roundabouts to improve traffic flow and reduce the risk of fatal and serious collisions as well as reducing emissions, and maximizing the life of the existing pavement before replacement. Moving Washington and the I-90 Corridor Planning Study place the highest priority on maintaining and preserving the safe and long-lasting performance of existing infrastructure, facilities and services.

For more information on the WSDOT sustainable transportation program visit the website:

[www.wsdot.wa.gov/SustainableTransportation/](http://www.wsdot.wa.gov/SustainableTransportation/)

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## **WSDOT & Sustainable Transportation**

**Sustainable transportation** is a system that preserves the environment, is durable and takes into account how we build and the materials we use. It's a system that uses strategies to meet society's present needs without compromising the ability of future generations to meet their own needs.

### **Consider sustainability in all we do**

Emissions from transportation-related activities account for nearly half of the total greenhouse gas (GHG) emissions in Washington. This is one reason why WSDOT considers sustainability in all that we do. Our practices make good environmental sense and good economic sense for Washington. Our agency uses a strategic and balanced approach to conserve energy and fuels while reducing greenhouse gas emission from the transportation sector.

### **Making transportation sustainable**

WSDOT is making transportation more sustainable in a multitude of ways - from long-range plans to our day-to-day operations. This includes designing highways that work best for communities, integrating transit, bicycling and walking into projects and employing techniques that reduce storm water pollutants. Our maintenance crews use precision snow and ice removal techniques that keep drivers safe while using the minimum amount of salt necessary.

### **Technology**

WSDOT is using new technology and innovative methods in our efforts to provide a more reliable, responsible and sustainable transportation system. We are taking steps to conserve fuel and energy, reduce carbon emissions, and protect our natural environment while keeping people and goods moving.

### **Efficiency**

WSDOT is making highways more efficient by smoothing traffic flow through our busiest choke points. We're using fewer building materials by recycling and extending the lifespan of roads, bridges and other structures.

### **Reducing the carbon footprint**

WSDOT is helping citizens and businesses reduce their carbon footprint in new ways, from expanding transit services and ridesharing opportunities to partnering to build support infrastructure along I-5 for electric and other alternative-fuel vehicles.

**For more information visit the WSDOT Sustainable Transportation homepage::**

[www.wsdot.wa.gov/SustainableTransportation/](http://www.wsdot.wa.gov/SustainableTransportation/)

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## 7.7 Initiate Project Development Process

As funding becomes available, WSDOT and/or its partner agencies will need to complete necessary project development steps. The lead agency will determine the appropriate level of state and federal documentation for each proposed project and conduct public involvement throughout the project development process. Changes in access to I-90 will likely require an Interchange Justification Report (IJR). Some elements that are required in the project development are:

**Project Scoping** – A scoping document is prepared that includes a scope of work, justification for the project, identifies risks, operational and environmental issues, key schedule milestones, a capital cost summary cash flow, and financial plan.

**Design Phase** – Preliminary engineering to determine and refine project plans.

**Right-of-Way Studies** – Records are reviewed to determine property ownership and boundaries surrounding the proposed project. The findings are then assessed to determine if property needs to be secured to construct the project.

**Environmental Phase** – The purpose of the environmental process is to meet federal and state regulations by evaluating project alternatives and identifying ways to avoid and minimize negative effects to the community and the environment. The process evaluates project alternatives against some or all of the following environmental topics:

Agricultural Resources and Farmland	Social Elements
Air Quality	Socioeconomic Groups
Environmental Justice	Traffic Noise
Geological Inventory	Water Quality
Hazardous Materials	Wetlands
Historical, Cultural, and Archeological Resources	Wild and Scenic Rivers
Land Use Compatibility	Streams and Fish Passage
Parks	Wildlife Habitat
Public Utilities	Floodplains

**Public Involvement and Outreach** – The public is informed and engaged during project development to review project plans and provide feedback on potential impacts and/or benefits.

**Construction Phase** – The project is constructed.

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## 7.8 Next Steps

The I-90 Corridor Planning Study identifies corridor needs that are based on adopted WSDOT thresholds. The Study proposes actions to address the identified corridor needs. While this study alone does not guarantee funding, the plan allows future consideration for funding requests to be focused on areas of greatest need in this corridor. These proposed improvements will compete with other similar projects around the state for future funding based on performance outcome.

Because available revenue to implement the identified improvements is limited, specific actions should be taken to position the I-90 proposed improvements for future implementation. These actions include:

- Incorporate the recommended improvements into the State Highway System Plan (HSP)
- Incorporate the recommended improvements into PSRC's regional transportation plan (Transportation 2040)
- Incorporate the recommended improvements, as appropriate, into county and city comprehensive plans
- Incorporate Recommendations into transit agency plans

For more information, visit the project website:

[www.wsdot.wa.gov/planning/RDP/I90/EastgateTo465th/](http://www.wsdot.wa.gov/planning/RDP/I90/EastgateTo465th/).

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