CHAPTER 5 EFFECTS OF THE PROJECT

This chapter presents an analysis of the potential effects the project could have on people and the environment. To determine these effects, WSDOT initiated 15 different studies. The project team documented its detailed analyses in discipline reports and technical memoranda that illustrate how the project might affect the area.

WSDOT evaluated the following environmental topics:

- Air Quality
- Environmental Justice
- Geology and Soils
- Hazardous Materials
- Cultural Resources
- Ecosystems
- Energy
- Land Use, Economics, and Relocations
- Noise
- Social Elements
- Transportation
- Visual Quality and Aesthetics
- Water Resources
- Section 4(f) Resources
- Indirect and Cumulative Effects

The key findings of these evaluations are summarized in this chapter. The discipline reports and technical memoranda that describe these evaluations are provided in Appendices G through U.

The project will not affect the following environmental elements:

- Farmland
- Wild and scenic rivers
- Coastal barriers

As a result, these elements are not addressed in this EA.

What federal, state, and local environmental laws and regulations apply to the project?

Federal, state, and local laws and regulations provide the legal framework for the analyses described in this EA. In many cases, these interrelated laws and regulations set thresholds

that provide a basis for evaluating how the project will affect a particular resource, such as air quality or water quality, and whether the effect will be significant. A summary of applicable laws, regulations, and ordinances is provided in Appendix D, Regulatory Framework.

How did WSDOT evaluate the effects of the project on the environment?

After modifying the design to minimize or avoid known potential effects, WSDOT compared the Build Alternative, and the No Build Alternative, to the existing conditions. This comparison enabled WSDOT to determine environmental, social, and economic changes that could result from constructing and operating the project.

What are best management practices?

Best management practices, commonly referred to as BMPs, are methods used to minimize or avoid environmental effects. The term "BMP" is widely used to refer to a variety of common management techniques. These practices represent the most practical methods available and are continually being improved. Examples of BMPs are (1) using silt fences during construction to minimize erosion, (2) using biofiltration swales and other facilities to control and treat stormwater, and (3) limiting work periods to when the fewest fish are expected to be present to protect fish and streams during in-water work.

WSDOT's analysis of project effects took into consideration standard construction practices that have been developed to avoid adverse effects; for example, exposure of bare ground during construction can increase erosion and wash soil into local streams. Because of this potential for adverse effects, WSDOT will use best management practices (BMPs) to control erosion and maintain water quality. These standard practices will reduce adverse effects and will be considered part of the project.

How did WSDOT use environmental information to improve the project?

After collecting the existing conditions data, the project team met with the roadway design engineers to identify where the project's effects on the environment could be avoided or reduced. For example, to reduce effects on wetlands, WSDOT overlaid wetland locations on the preliminary design plans and adjusted the roadway alignment, reduced the number of roadside slopes by adding retaining walls, and adjusted the location of stormwater facilities.

Did the analysis of some environmental elements show that the project will have a negligible effect?

Many of the project studies found that the project will not cause any appreciable effects. The studies that found negligible effects are summarized below for the following environmental elements:

- **Air Quality:** The project is not expected to cause or contribute to any new violation of the National Ambient Air Quality Standards (NAAQS). The project is expected to have a low overall potential for mobile source air toxic (MSAT) emissions. The project meets conformity requirements in 40 CFR Parts 51 and 93. Any air quality effects related to project construction will be temporary. For more information, see Appendix G, Air Quality Technical Memorandum.
- **Environmental Justice:** Low-income and minority populations live in the project vicinity, but the project team does not anticipate that project construction or operation will have disproportionately adverse effects on low-income or minority populations.

  The "usual and accustomed" areas of the Muckleshoot Indian Tribe are located in the project vicinity. However, WSDOT has been and will continue coordinating with the staff of the Muckleshoot Indian Tribe Fisheries Division to avoid or minimize adverse effects.

  Under the Build Alternative, project construction will temporarily increase congestion and noise and change access for the businesses and residents in the area, including low-income or minority populations. During operation of the project, no negative effects are anticipated due to improved transit service. For more information, see Appendix H, Environmental Justice Technical Memorandum.
- **Geology and Soils:** The proposed project will have a minimal effect on the geology and soils in the project vicinity. While there are geologic hazards in the area, including unstable slopes, liquefaction, and landslides,

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water.

these hazards will be taken into account during design and construction of the project to minimize the effects.

The project will result in changes in soil layers as materials are removed to accommodate project elements (for example, retaining walls) or as soils are removed or placed to improve performance of project elements. Construction activities on steep slopes and through areas with known or suspected past landslides will use modern engineering and construction techniques developed to minimize landslide hazards. For more information, see Appendix I, Geology and Soils Technical Memorandum.

- **Hazardous Materials:** No unavoidable negative effects relating to hazardous materials and no unavoidable negative effects on the environment or human health due to contamination are expected as a result of construction or operation of the project. There is potential for hazardous materials spills (for example, fuel from construction equipment) to occur during construction. Appropriate BMPs will be implemented to prevent or address any hazardous materials releases that could occur during construction of the project.

  The most likely effects associated with hazardous materials include encountering contaminated soils and groundwater, generating hazardous building materials through demolition, encountering underground storage tanks (USTs) or leaking underground storage tanks (LUSTs), creating accidental spills, and addressing worker safety and public health issues.

  The project team identified 13 low to moderate risk hazardous materials sites in the project vicinity (within one mile of the centerline of the portion of roadway where construction will occur). Based on available site information, out of the 13 low to moderate risk sites, 3 hazardous material sites have the potential to affect project construction. These sites include a service station, a maintenance facility, and an identified LUST/UST property. No high risk hazardous materials sites were identified. For more information and maps showing the locations of potential hazardous materials sites, see Appendix J, Hazardous Materials Technical Memorandum.

CHAPTER 5.1 Cultural Resources

The project will not adversely affect any significant historic or archaeological resources. Several aspects of the project will have beneficial effects on historic properties adjacent to the roadway.

Please refer to the Cultural Resources Technical Memorandum in Appendix K for additional information about the cultural resources analysis.

Cultural resources are districts, sites, structures, objects, people, documents, or traditional places that may be important in American history or prehistory. Cultural resources include both historic and archaeological resources.

Cultural resources provide an important link to the past while establishing meaningful connections to lives today. They serve as memories and symbols of a community's accomplishments and represent the distinctive architectural, landscape, and engineering designs of the region. Cultural resources represent aspects of the physical environment that relate to culture, society, and institutions that bond communities together and link them to their environmental and social surroundings.

Why are cultural resources considered in this EA?

Under Section 106 of the National Historic Preservation Act (NHPA), federal agencies must identify cultural resources and evaluate the historical significance and state of preservation in order to consider how their undertakings affect historic properties eligible for inclusion in the National Register of Historic Places (NRHP). Federal agencies must consult with the State Historic Preservation Officer (SHPO) and Native American tribes as part of the Section 106 review process.

What is the National Register of Historic Places?

The National Register of Historic Places (NRHP), authorized under the National Historic Preservation Act of 1966, is the nation's official list of properties and other cultural resources that are recognized as deserving preservation. National Register properties include districts, sites, buildings, and objects that are significant in American history.

Washington's State Environmental Policy Act (SEPA) requires state and local agencies to consider the likely environmental consequences of a proposal before approving or denying the proposal. This includes evaluation of any places or objects listed on, or proposed for, national, state, or local preservation registers. The Department of Transportation Act of 1966 also includes a special provision, commonly referred to as *Section 4(f)*, that requires federal agencies to consider how their proposed actions and policies may affect historic sites.

What is Section 4(f)?

Section 4(f) of the U.S. Department of Transportation Act of 1966 declares that a special effort must be made to preserve the natural beauty of the countryside, including public parks and recreation lands, wildlife and waterfowl refuges, and historic sites.

Chapter 5.10, Section 4(f) Resources, discusses this subject in greater detail.

Furthermore, in November 2005, Washington Governor Chris Gregoire signed Executive Order 05-05, which requires state agencies with capital improvement projects to integrate their planning efforts with input from the Department of Archaeology and Historic Preservation (DAHP), the Governor's Office of Indian Affairs (GOIA), and concerned tribes.

How did WSDOT evaluate cultural resources for this project?

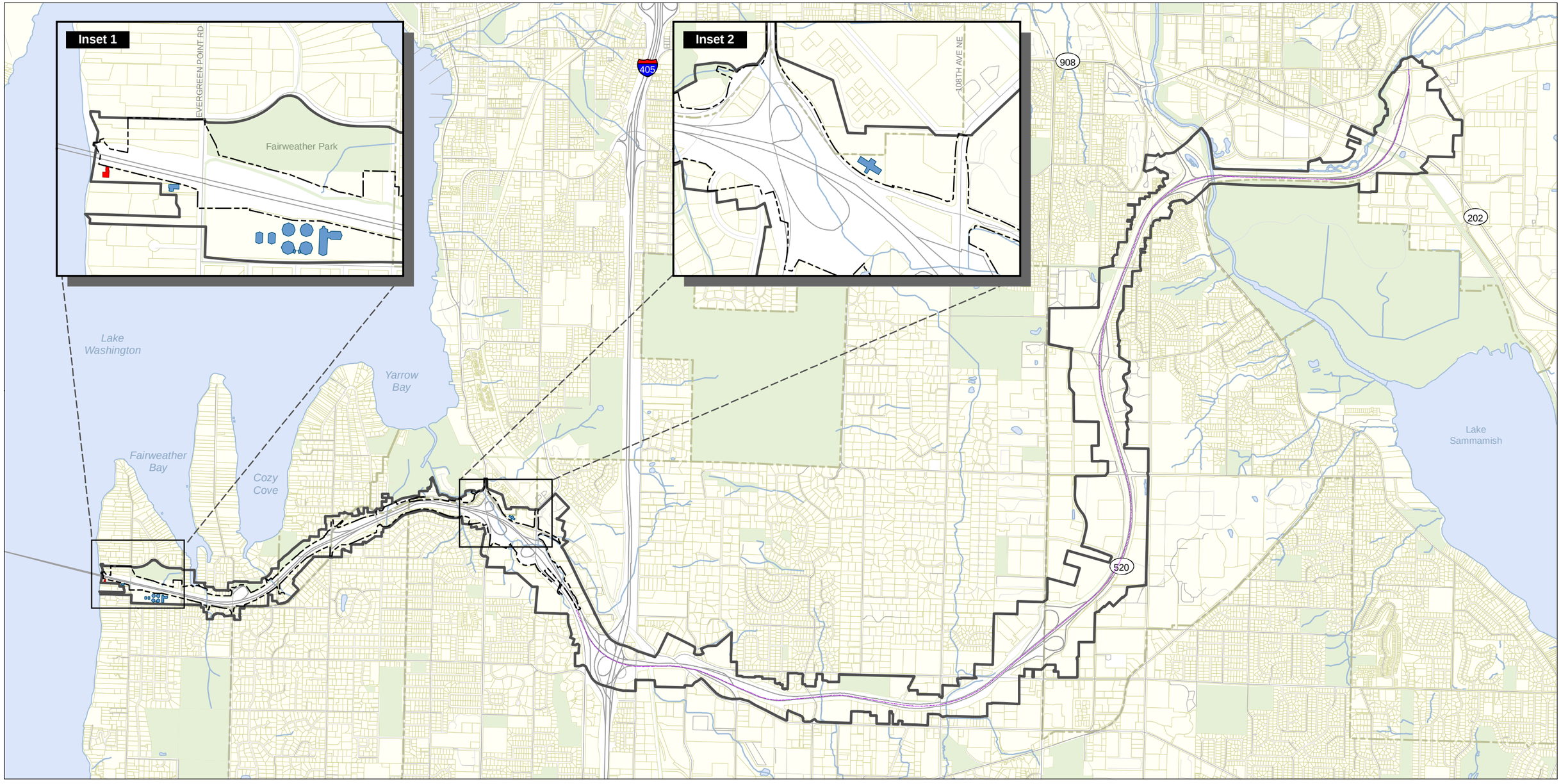
What is the area of potential effects?

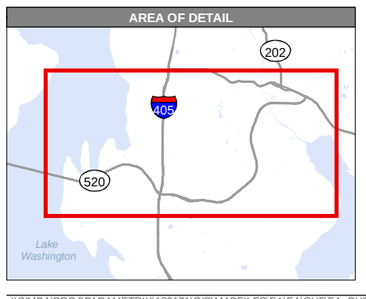
The area of potential effects (APE) is the area in which cultural resources, if they are present, could be directly or indirectly affected by the project.

To evaluate potential project effects on cultural resources, WSDOT established an area of potential effects (APE) in consultation with the SHPO and with identified concerned Native American tribes. The APE was generally limited to the footprint of the project for analysis of direct effects and usually a city block beyond the right of way for indirect effects. Exhibit 5-1 shows the APE.

Team historians reviewed historic and cultural resources site files maintained by DAHP and by the Cultural Development Authority (CDA) of King County. They also conducted field investigations in accordance with the NRHP, Washington Historic Register (WHR), King County, and local landmarks evaluation criteria to identify and document prehistoric and historic period archaeological sites, as well as buildings and structures more than 50 years of age within the APE.

Letters of concurrence regarding the APE from DAHP are included in Appendix B, Agency and Tribal Correspondence.





Area of Potential Effects

Eligibility of Surveyed Structure

Washington Historic Register Eligible

National Register of Historic Places Eligible

Restriping

Limits of Construction

Parcel

Park

N

0 1,250 2,500 5,000 Feet

Source: City of Bellevue (2004) GIS Data (Parcel), City of Redmond (2009) GIS Data (Parcel), City of Kirkland (2008) GIS Data (Parcel) King County (2008) GIS Data (Parcel,Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.

Exhibit 5-1. **Area of Potential Effects Overview Map**

Medina to SR 202: Eastside Transit and HOV Project

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What cultural resources are located in the study area?

Historic Resources

The APE contains no previously identified historic properties. The survey conducted as part of the historic resources effects analysis identified three NRHP-eligible properties and one WHR-eligible property.

NRHP-eligible Properties

James Arntson House, 2851 Evergreen Point Road, Medina

The James Arntson house (Exhibit 5-2), a modern-style residence, was constructed in 1953 and is eligible for the NRHP for its distinctive architectural characteristics, uniquely representative of its mid-century period. It is also eligible for the WHR for its strong architectural qualities.

Exhibit 5-2. James Arntson House, 2851 Evergreen Point Road, Medina

Googie architecture originated in the late 1940s and continued into the 1960s. The style, characterized by upswept roofs, geometric shapes, and the use of neon and steel elements, was influenced by car culture and space and atomic age concepts.

BurgerMaster, 10606 Northup Way, Bellevue

The BurgerMaster restaurant in Bellevue (Exhibit 5-3) was built in 1967. The building is architecturally significant as a rare surviving example of "Googie-style" roadside architecture. It is eligible for the NRHP for its architectural significance and unique defining characteristics.

Bellevue Christian School, 7800 NE 28th Street, Medina

Bellevue Christian School (Exhibit 5-4), originally built as the Three Points Elementary School in 1961, is a collection of Modern buildings designed by the noted Seattle architectural firm Narramore, Bain, Brady, and Johanson, now known as NBBJ. The complex has had few alterations and is intact and well maintained. It will be 50 years old in 2011.

At that time, it will be eligible for the NRHP for its distinctive architectural characteristics, representational of educational design theories of its period, and as the work of a masterful, world-renowned architectural firm. It will also qualify for the WHR for its strong architectural qualities and its design by an influential architectural firm.

WHR-eligible Property

Helen Pierce House, 2857 Evergreen Point Road, Medina

The Helen Pierce house (Exhibit 5-5), a residence formerly known as 2857 76th Avenue NE, was constructed in 1920 and appears to be one of the original buildings in the area. Although the site may not meet NRHP eligibility criteria because of reconstruction, as well as alterations and additions since then, it is eligible for the WHR as a representative element of the early settlement of the community.

Exhibit 5-3. BurgerMaster, 10606 Northup Way, Bellevue

Exhibit 5-4. Bellevue Christian School, 7800 NE 28th Street, Medina

Exhibit 5-5. Helen Pierce House, 2857 Evergreen Point Road, Medina

Archaeological Resources

For archaeological resources, a total of 494 shovel probes (336 in the SR 520 corridor and 158 in the Keller Mitigation Site, a proposed mitigation site) were excavated during the survey. Two archaeological resources were found, consisting of historic road segments: a two-track farm road with an associated log bridge at the Keller Mitigation Site, and an abandoned historic segment of East Lake Washington Boulevard along the corridor. Mitigation is not necessary for these archaeological resources because they

What is the Keller Mitigation Site?

The Keller Mitigation Site is a site proposed by WSDOT for compensatory wetland mitigation. The site is located in the Bear Creek basin. WSDOT proposes rehabilitation of approximately 30 acres of wetland and wetland buffer on the site. See Chapter 6 for additional information about proposed wetland mitigation.

are not historically significant elements of a larger potentially-eligible resource.

Please refer to Appendix B, Agency and Tribal Correspondence, and Appendix K, Cultural Resources Technical Memorandum, for additional information about cultural resources.

How will construction activities affect cultural resources?

Historic Resources

Construction of the Build Alternative will affect the historic built environment properties in the APE, but none of these effects is considered adverse under Section 106 regulations and guidelines. These construction effects will be short-term and limited to specific construction activities. Throughout construction, the properties will be able to be continuously used, and no impairment is expected to the characteristics that qualify the properties for inclusion in the NRHP.

The houses located at 2851 and 2857 Evergreen Point Road may experience vibrations specifically associated with demolition of the existing Evergreen Point Road overpass and construction of the new Evergreen Point Road lid. Noise and dust generated during construction of the new lid and associated improvements to Evergreen Point Road may also affect these two properties.

The Bellevue Christian School grounds may be affected by noise and dust generated during construction because the school has exterior circulation walkways that must be used by the students and faculty throughout the school day. In addition, the physical education/outdoor play area located next to SR 520 may be affected by construction dust and noise during the school day. Noise from construction may also temporarily affect the academic environment at the school. A very small piece of school property (157 square feet) will be used temporarily under a construction easement to accommodate removal of the existing pedestrian crossing. The property may also experience vibration specifically associated with demolition of the existing Evergreen Point Road overpass and the existing pedestrian crossing, and construction of the new Evergreen Point Road lid.

All three of these properties – 2851 and 2857 Evergreen Point Road, and the Bellevue Christian School – may experience limited access or detours during certain times throughout construction, especially during the construction of the Evergreen Point Road lid and improvements to Evergreen Point Road. Traffic from construction equipment accessing the work site could generate short-term noise, vibration, and dust at these three properties, especially while accessing the work site for the Evergreen Point Road lid.

BurgerMaster at 10606 Northup Way may experience vibration specifically associated with demolition of the existing ramp loop at the northeast corner of Bellevue Way and SR 520. Noise and dust generated during construction may affect the restaurant during the day because it has exterior circulation and delivers customers' food outside to their cars. BurgerMaster may experience limited access or detours during certain times throughout construction because the section of Northup Way in front of the restaurant will be used under a construction easement, and part of it will be rebuilt, with a bike path constructed adjacent to it.

Archaeological Resources

Two known archaeological resources (a two-track farm road with an associated log bridge at the Keller Mitigation Site and an abandoned historic segment of East Lake Washington Boulevard) were identified in the project APE, but neither is considered historically significant. One has been extensively disturbed by prior development of the project area and vicinity, and the other has only limited information potential. The Build Alternative will have no effect on these known archaeological resources.

A letter of concurrence from DAHP regarding the effects analysis is included in Appendix B, Agency and Tribal Correspondence.

How will the completed project affect cultural resources?

Historic Resources

Operation of the Build Alternative will affect the historic built environment properties in the APE, but none of these effects is considered adverse under Section 106 regulations and guidelines. All of these effects will be beneficial to the historic properties.

As part of the project, new landscaped lids will be added over SR 520 at Evergreen Point Road, 92nd Avenue NE, and Hunts Point Road/84th Avenue NE. These lids will help dampen sound, provide added green space, and reconnect communities that were divided when SR 520 was built in the 1960s, enhancing and partially restoring the setting of historic properties in these communities. The lids will also help minimize the visual effect of SR 520 on the surrounding properties. Specific historic properties benefiting from the proposed noise walls and lids will be the James Arntson house and the Bellevue Christian School, described below.

The NRHP-eligible residence at 2851 Evergreen Point Road, known as the James Arntson house, will not experience any adverse effects from the Build Alternative. The Arntson house may experience beneficial visual and audible effects from the new Evergreen Point Road lid. This landscaped lid will increase green space adjacent to the property and reduce the visibility of SR 520 from the property. The lid and proposed noise walls will decrease the noise level at the Arntson house from operation of SR 520. The current noise level at this site exceeds 66 dBA. The lid and proposed noise walls will reduce the noise level and result in a noticeable noise decrease. For more specific information on noise effects, please refer to Appendix O, Noise Technical Memorandum.

Bellevue Christian School at 7800 NE 28th Street, an NRHP-eligible property, will not experience any adverse effects from operation of the project. The property will receive beneficial effects from the new Evergreen Point Road lid and proposed noise walls, which will reduce the existing noise level. The school will experience a visual effect from the presence of the proposed noise walls, but this effect will not be adverse. The

proposed noise walls will also serve to visually screen the school from part of SR 520, to which it is currently exposed.

BurgerMaster, an NRHP-eligible property at 10606 Northup Way, will not experience any effects from operation of the freeway.

The WHR-eligible property at 2857 Evergreen Point Road, known as the Helen Pierce house, will not experience any effects from operation of the project.

In addition, no indirect effects on historic built environment properties are expected from the project.

Archaeological Resources

The completed project will have no adverse effect on archaeological resources.

A letter of concurrence from DAHP regarding the effects analysis is included in Appendix B, Agency and Tribal Correspondence.

What will happen to cultural resources if WSDOT does not build this project?

Historic Resources

The No Build Alternative assumes that only routine maintenance, repair, and minor safety improvements will take place on SR 520 in the project vicinity over the next 20 years. Therefore, no adverse effect to historic resources will occur from construction under the No Build Alternative.

Three NRHP-eligible properties and one WHR-eligible residence adjacent to SR 520 experience highway noise, air pollution, and visual intrusion from the highway, and these operational effects to historic properties will continue under the No Build Alternative.

Archaeological Resources

Two known archaeological resources have been identified in the project APE (a two-track farm road with an associated log bridge at the Keller Mitigation Site and an abandoned historic segment of East Lake Washington Boulevard), but neither is considered historically significant. Both archaeological resources are characterized by either extensive disturbance from prior development of the project area and vicinity,

and/or limited information potential. The No Build Alternative will have no effect on the two known archaeological resources.

CHAPTER 5.2 Ecosystems

The project will temporarily disturb approximately 1.4 acres of wetlands and 0.9 acre of wetland buffer, and permanently fill approximately 7.0 acres of wetlands and 1.7 acres of wetland buffer. Construction will temporarily disturb approximately 14 acres of wildlife habitat and 3.23 acres of riparian buffer. Approximately 65 acres of wildlife habitat and 2.13 acres of riparian buffer will be permanently disturbed. There will be 0.24 acre of permanent stream channel impact. Channel realignments and culvert removals and replacements will result in a gain of approximately 820 linear feet of open channel habitat within fish-bearing streams, including opening up approximately 787 linear feet of stream channel currently confined to culverts.

WSDOT will provide mitigation to compensate for any adverse effects on ecosystems. Once completed, the project will improve fish passage and stream alignments, resulting in long-term benefits to habitat quality and quantity for fish and aquatic species.

Please refer to the Ecosystems Discipline Report in Appendix L for additional information about the ecosystems analysis.

Why are ecosystems considered in this EA?

An ecosystem is a biological community interacting with its physical and chemical environment as an integrated, dynamic unit. Ecosystems are made up of living organisms, including humans, and the environment they inhabit. Understanding the relationship between living organisms and their environment is integral to the environmental review process. Various federal, state, and local regulations including the National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) require evaluation of the effects of a proposed project on ecosystem structure, function, and process.

This chapter describes the analysis of three important resources—wetlands, wildlife and habitat, and fish and aquatic habitat.

How did WSDOT identify and evaluate ecosystems in the study area?

Wetlands

The project team consulted numerous digital and paper maps to determine the location of known and potential wetlands in the project vicinity, including aerial photographs and local and federal wetland inventories. The team supplemented existing information with data collected in the field. The team examined an area approximately 200 feet wide on either side of the proposed project footprint to verify the location of previously-mapped wetlands and to locate wetlands not appearing on existing inventories. In addition, the team investigated wetlands in the Cozy Cove and Yarrow Bay areas because the project could affect these areas. The team supplemented data collected in the field with aerial photographs to interpret and map wetland boundaries beyond the project footprint. The team also qualitatively characterized wetland functions.

A **buffer** is a designated area along and adjacent to a stream or wetland that may be regulated to control the negative effects of adjacent development on the aquatic resource.

The team evaluated potential effects to wetlands by overlaying the project footprint onto wetland and wetland buffer maps to determine the extent of permanent and temporary effects to wetlands and wetland buffers. In addition, the team used these data and other information to evaluate project effects on wetland functions and values.

Wildlife and Habitat

The team reviewed reports from local and state agencies to identify wildlife habitat and distribution of wildlife in the study area. Project team members also conversed with federal, state, and local biologists to obtain information on wildlife species' occurrence in the study area. To supplement the existing information, the team conducted field surveys within one-quarter mile of the project footprint to identify wildlife habitat and wildlife.

A **geographic information system** (GIS) is a digital computer mapping system that can overlay a wide variety of data such as land use, utilities, and vegetative cover, and provide a spatial analysis.

The team evaluated potential effects on wildlife and wildlife habitat by determining the type, location, and acreage of habitat affected by the project using data collected in the field and geographic information system (GIS) data. Additionally, the team reviewed literature on the effects of construction and highway traffic on sensitive habitats and species. The team

also reviewed literature on the effects of road construction and operation on wildlife and wildlife habitat.

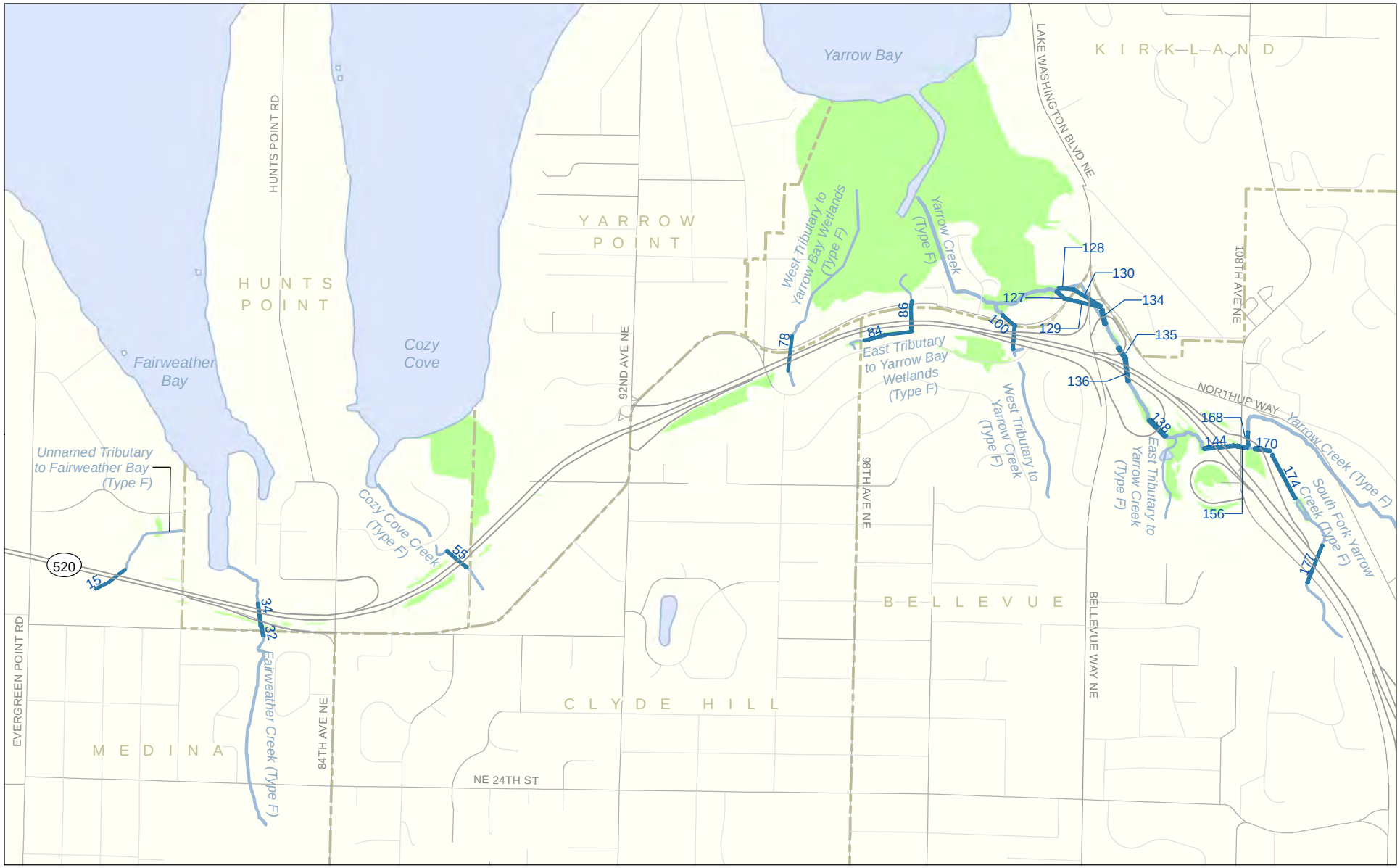
Fish and Aquatic Habitat

The team collected documented information on fish species and their distribution and habitat within the area by reviewing literature such as peer-reviewed articles in scientific journals, technical reports, and data from various state, county, and city agencies. Project team members also conversed with tribal, federal, state, and local biologists to obtain information on fish use and aquatic habitat. The team surveyed and characterized the in-stream habitats of the following Lake Washington tributary streams within and adjacent to the project right of way: Unnamed Tributary to Fairweather Bay, Fairweather Creek, Cozy Cove Creek, Yarrow Creek, South Fork Yarrow Creek, West Tributary to Yarrow Creek, West Tributary to Yarrow Bay wetlands, and East Tributary to Yarrow Bay wetlands (see Exhibit 5-6). The team used stream habitat survey procedures consistent with the current King County Level I (Basic) stream survey methods and guidelines (King County 1991), except that pools were measured using methods to account for residual pool size (Pleus et al. 1999).

Fairweather Creek

The team analyzed the potential effects of the project on fish and aquatic habitat resources by assessing project design data and WSDOT construction practices to identify changes to fish habitat likely to occur during and following construction of the Build Alternative. This assessment included GIS analysis of stream channel (including culverts) and riparian buffer effects and quantitative analyses of the effects of project stormwater on pollutant loading. The team worked collaboratively with the project designers to minimize effects on aquatic resources and to design channel relocations and fish passage structures that will provide benefits to aquatic species and habitat.

A **culvert** is a pipe or concrete box structure that drains open channels, swales, or ditches under a roadway or embankment. Typically, a culvert is not connected to a catch basin or manhole along its length.



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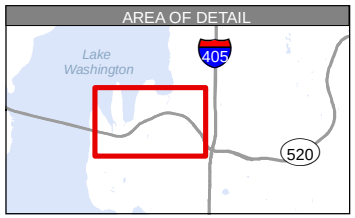

15 Existing Culvert (Structure ID)

Stream

Wetland

Jurisdictional Boundary

NOTE: Water types above SR 520 may change

N

0 500 1,000 2,000 Feet

Source: Parametrix (2009) GIS Data (Wetalands and Culverts), King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.

Exhibit 5-6. **Existing Stream Alignment and Culvert Locations**

Medina to SR 202: Eastside Transit and HOV Project

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What ecosystems are located in the study area?

Wetlands

Wetlands are regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. The project team has been coordinating with USACE for permits related to project effects to wetlands and in developing a wetland mitigation plan that will result in a reduction of effects on wetlands to achieve a no net loss of wetland functions. Refer to Chapter 6 for a discussion of proposed wetland mitigation.

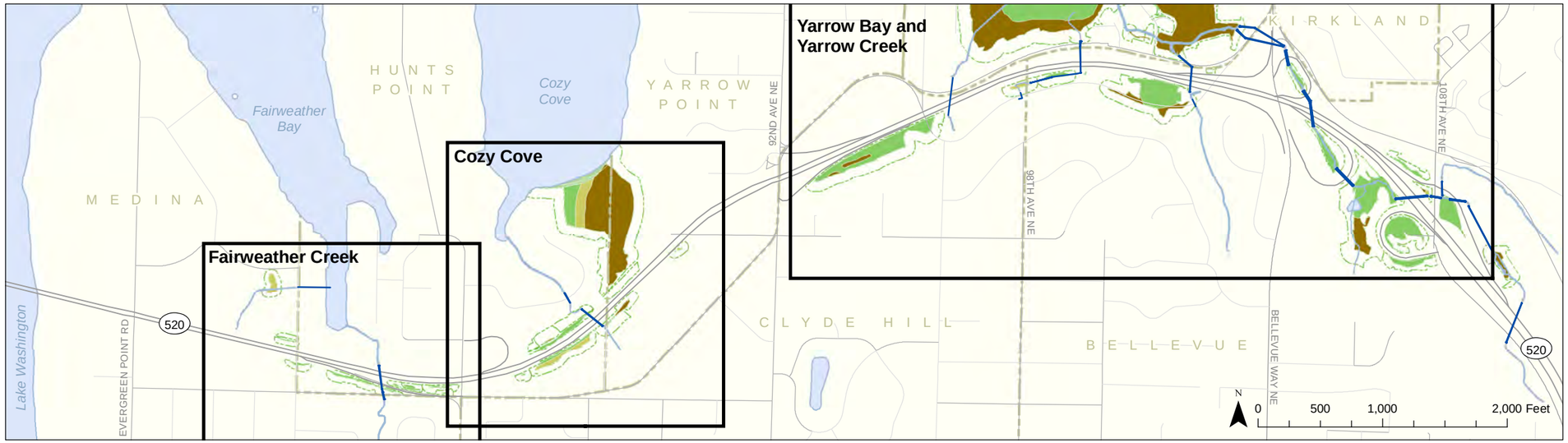
The **study area** for wetlands was a 200-foot-wide area on either side of the project footprint. For wildlife and wildlife habitat, the study area extended one-quarter mile from the project footprint.

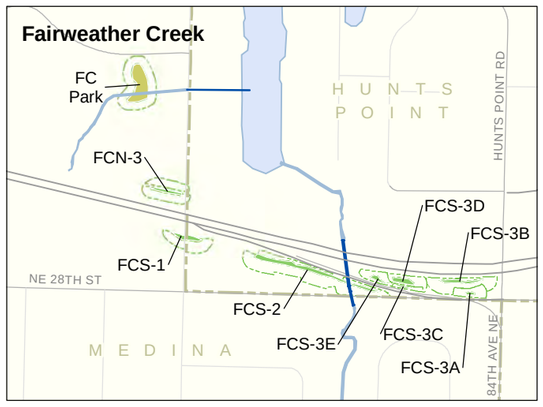
The study area contains 40 wetlands totaling approximately 97 acres. Wetlands in the study area are generally associated with streams, hillside seeps, or runoff from SR 520. Wetlands in the study area are representative of all four hydrogeomorphic (HGM) classifications: depressional, riverine, lake-fringe, and slope.

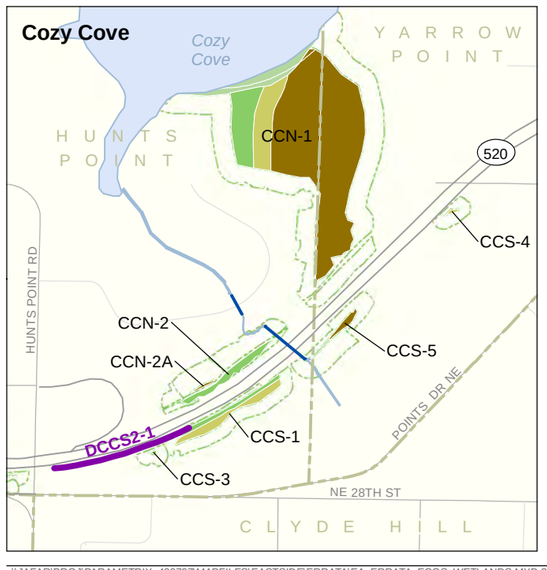
A **hydrogeomorphic** (HGM) classification of wetlands groups wetlands based on physical characteristics and the kinds of functions that wetlands may develop based on their characteristics. Characteristics that control the functions a wetland may provide include a wetland's physical properties and source of water, geologic setting, and the ways water moves through the environment. This classification system places less emphasis on the composition of the plant community in a wetland.

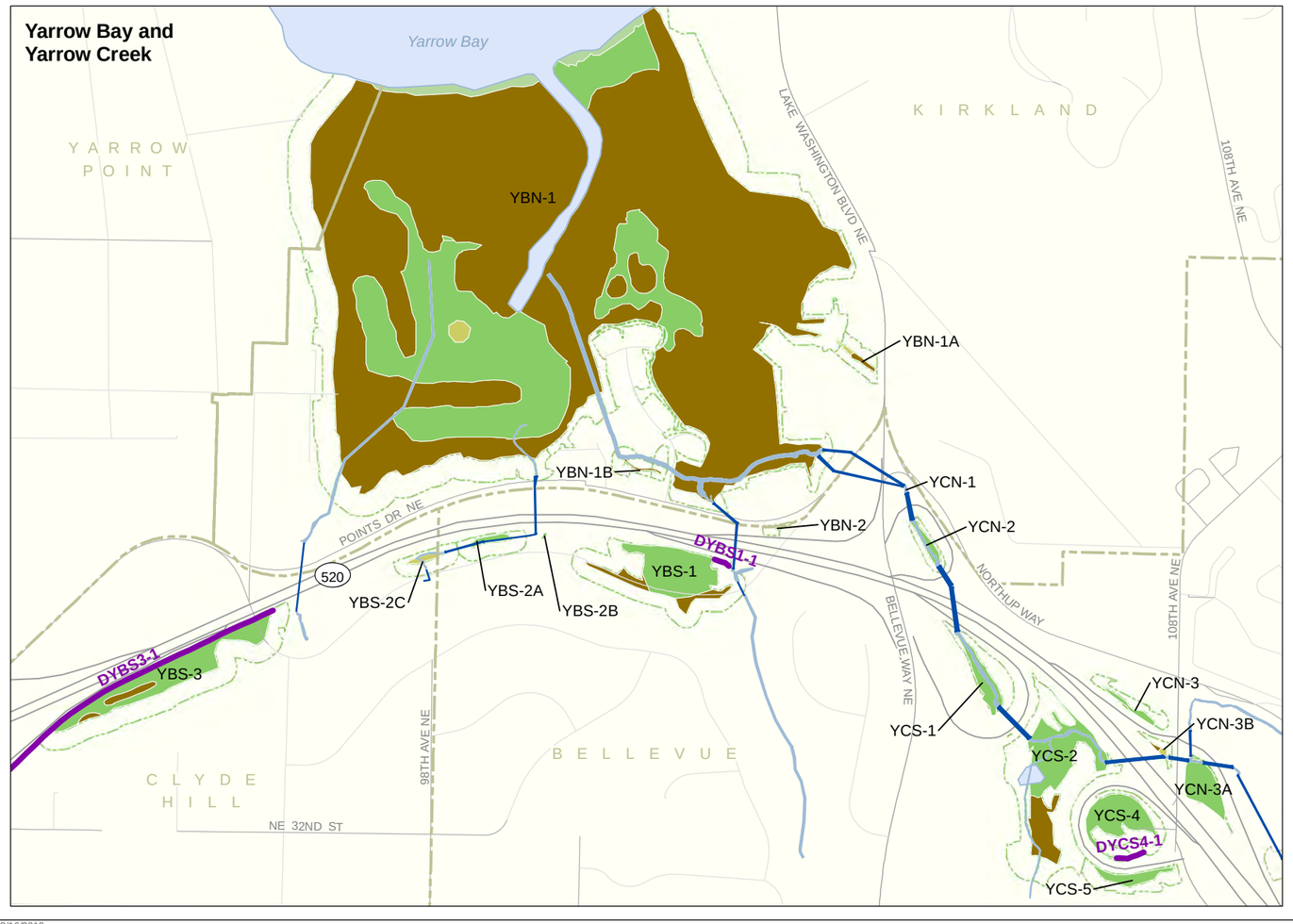
Wetlands in the study area perform a variety of functions, to varying degrees, including improving water quality, reducing flooding and erosion, providing habitat for aquatic and terrestrial species, and providing recreational and educational opportunities to the public.

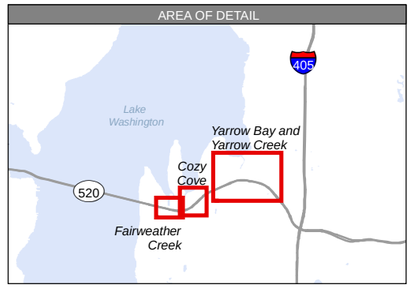
Exhibit 5-7 shows the locations of these wetlands. Each wetland is identified using a unique designation consisting of a two-letter abbreviation of the watershed location: a single letter for direction (north or south of SR 520) and a number.











- Jurisdictional Ditch
- Culvert
- Stream

Wetland Vegetation Class

- L2AB (Aquatic Bed)
- PFO (Palustrine Forested)
- PSS (Palustrine Scrub-shrub)
- PEM (Palustrine Emergent)
- Wetland Buffer
- Jurisdictional Boundary

N 0 250 500 1,000 Feet

Source: King County (2005) GIS Data (Street), King County (2007) GIS Data (Waterbody), CH2M HILL (2008) GIS Data (Stream and Park), and City of Bellevue (1999) GIS Data (City Limits). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-7. **Existing Wetlands and Jurisdictional Ditches**

Medina to SR 202: Eastside Transit and HOV Project

Wildlife and Habitat

The team evaluated wildlife and wildlife habitat within one-quarter mile of the project footprint. The team categorized the study area into three cover types based on similarities in landscape features (for example, presence of vegetation, buildings, and roads) and expected wildlife occurrence and use. The three cover types in the study area are Urban Matrix, Open Water, and Parks and Other Protected Areas. Land cover in the study area totals approximately 1,167 acres.

Exhibit 5-8 lists the associated acreages and percentages of land cover types in the study area.

Exhibit 5-8. Land Cover Types in the Study Area

Cover Type	Land Cover in Study Area (acres)	Percentage of Land Cover in Study Area (percent)
Urban Matrix	971	83
Open Water	93	8
Parks and Other Protected Areas	103	9
Total	**1,167**	100

Urban Matrix – Commercial and residential areas with buildings, asphalt, ornamental gardens, lawns, and scattered trees. Urban Matrix provides limited habitat for common birds, small mammals, and amphibians.

Open Water – Fairweather Bay, Cozy Cove, Yarrow Bay, and Lake Washington. Open water provides habitat for freshwater-associated wildlife, including waterfowl, amphibians, river otters, and beavers.

Parks and Other Protected Areas – Includes Fairweather Park, Wetherill Nature Preserve, and Yarrow Bay wetlands. This land cover type provides habitat for a variety of birds. Wetlands and riparian areas provide habitat for birds and small mammals, and provide potential nesting, roosting, and perching sites for great blue herons, bald eagles, and other bird species.

No federally-listed endangered, threatened, or candidate terrestrial species are known to occur in the study area. The U.S. Fish and Wildlife Service (USFWS) identifies several Endangered Species Act (ESA) listed species, including Canada lynx, gray wolf, grizzly bear, marbled murrelet, northern spotted owl, golden paintbrush, Oregon spotted frog, and yellow-billed cuckoo as potentially occurring in King County (USFWS 2007). However, no suitable habitat or historical sightings of any of these species have been documented within the study area.

Two federal species of concern, the bald eagle and peregrine falcon, may occur in the study area. One bald eagle breeding territory, Hunts Point, extends into the study area. Two nests have been identified in the territory; nests are between 900 and 2,400 feet from the project. The closest nest was active in 2009, while the other nest was last recorded active in 2006 (WDFW 2008). Peregrine falcons and/or their nests have not been observed or recorded within 1 mile of the study area (WDFW

2008); however, wetland and open water habitats in the study area may provide suitable foraging habitat for this species.

In addition to the bald eagle and peregrine falcon, several other state-listed sensitive or priority wildlife species or species of interest may use habitat in the study area. Other wildlife species include western grebe, common loon, great blue heron, cavity-nesting ducks (for example, hooded merganser and wood duck), band-tailed pigeon, pileated woodpecker, and red-tailed hawk.

Fish and Aquatic Habitat

The Lake Washington watershed supports a diverse group of fish species, including several species of native salmon and trout. Many of these species are an integral part of the economy and culture of the Pacific Northwest. The study area includes both anadromous salmonids (fish that migrate to the ocean) produced in the Lake Washington watershed and resident salmonids (fish that spend their entire lives within a freshwater stream).

Fish Species in the Study Area

Exhibit 5-9 list the more common fish species likely to occur at least occasionally in the study area streams. Exhibit 5-9 also provides information about the general habitat used by the species of greatest concern in the study area.

Salmonids are members of the fish family *Salmonidae*, including salmon, trout, and char.

Lake Washington tributaries provide spawning and early rearing habitat for salmonids such as Chinook, coho, and sockeye salmon and cutthroat and steelhead trout. Rainbow trout were commonly planted in Lake Washington in the past and are still present in the lake. Several observers have reported sightings of individual bull trout in the watershed, but there is no evidence of a substantial population or of reproduction occurring within Lake Washington or the lake's tributaries.

Exhibit 5-9. Prevalent Fish Species in the Project Vicinity

Species **Scientific Name**	**Federal and State Status**[a]	**Native or Nonnative Species**
Cutthroat trout *Oncorhynchus clarki*	None	Native
Steelhead/rainbow trout *Oncorhynchus mykiss* (anadromous/resident)	FT	Native
Chinook salmon *Oncorhynchus tshawytscha*	FT, SC	Native
Coho salmon *Oncorhynchus kisutch*	FCo for Puget Sound	Native
Sockeye salmon/kokanee *Oncorhynchus nerka* (anadromous/resident)	None	Native[b]
Peamouth chub *Mylochelius caurinus*	None	Native
Threespine stickleback *Gasterosteus aculeatus*	None	Native
Smallmouth bass *Micropterus dolomieui*	None	Nonnative
Brown bullhead *Ictalurus nebulosus*	None	Native
Northern pikeminnow *Ptychocheilus oregonensis*	None	Native
Pelagic sculpin *Cottus aleuticus*	None	Native
Prickly sculpin *Cottus asper*	None	Native

[a] FCo=Federal Species of Concern, FT=Federally Threatened, SC=State Candidate Species

[b] Introduced stock; uncertain whether there was originally a native stock inhabiting this watershed.

*Sources: Groot and Margolis 1991, Wydoski and Whitney 2003, SPU and ACOE 2008

Federally Listed Fish Species and Fish Species of Concern

Lake Washington supports one or more life stages of Chinook salmon, steelhead, and bull trout, all of which are currently listed as threatened under the ESA. Lake Washington Chinook salmon are a part of the threatened Puget Sound evolutionarily significant unit (ESU) (NMFS 1999). The National Marine Fisheries Service (NMFS) (now the National Oceanic and Atmospheric Administration, National Marine Fisheries Service [NOAA Fisheries]) designated critical habitat for the Puget Sound ESU of Chinook salmon, which includes Lake Washington, as well as the Ship Canal and Lake Union between the Ballard Locks and Lake Washington (NMFS 2005). No critical habitat is designated for any streams crossed by the proposed project alignment.

Evolutionarily significant unit is a term used by the National Marine Fisheries Service (now NOAA Fisheries) for a fish species population protected by an ESA listing.

The Puget Sound steelhead distinct population segment (DPS) is listed as threatened under the ESA (NMFS 2007). As of October 2009, critical habitat had not been proposed or designated for this DPS.

A **distinct population segment** (DPS) is a subgroup of a vertebrate species that is treated as a species for purposes of listing under the ESA. The subgroup must be separable from the species as a whole yet significant to the species to which it belongs.

USFWS listed the Coastal–Puget Sound DPS of bull trout as threatened in King County, including the population in the Lake Washington watershed (USFWS 1999). Distribution of bull trout in the Lake Washington watershed is uncertain, but individuals have been observed recently near the Hiram M. Chittenden Locks (Ballard Locks) and at various other locations over a number of years. USFWS has designated bull trout critical habitat in Lake Washington and in the Ship Canal and Lake Union between the Ballard Locks and Lake Washington (USFWS 2005). USFWS has not proposed critical habitat for bull trout in any Lake Washington tributaries crossed by the alignment of the proposed project.

The Puget Sound/Strait of Georgia population of coho salmon is listed as a species of concern by NOAA Fisheries.

WSDOT also prepared a Biological Assessment for the project in compliance with the ESA. The Biological Assessment addressed potential effects to listed species. On July 30, 2009, WSDOT received concurrence with the determination from USFWS that "the project will have no measurable adverse effects to bull trout, their habitat, or prey base in either the short- or long-term." WSDOT received the Biological Opinion on October 22, 2009 and subsequent concurrence with the determination from NOAA Fisheries that the project "is not

likely to jeopardize the continued existence of Puget Sound Chinook salmon and Puget Sound steelhead" and "is not likely to destroy or adversely modify designated Puget Sound Chinook salmon critical habitat."

Habitat Characteristics of Study Area Streams

In the study area, the SR 520 roadway directly crosses seven streams and lies adjacent to one additional stream. Exhibit 5-10 summarizes the known and presumed fish use of study area streams based on existing data and observation of in-stream habitat conditions. Relatively few field observations are reported in technical reports or literature for study area streams.

Is the project within a recognized tribal area?

The project site is within the "usual and accustomed" fishing area of the Muckleshoot Indian Tribe. The Muckleshoot Tribe's usual and accustomed fishing area includes Lake Washington. The Muckleshoot Tribe harvests adult salmon from Lake Washington pursuant to judicially recognized treaty rights, as interpreted by the Boldt Decision of 1974.

How will project construction affect ecosystems?

Project construction activities will occur in and adjacent to wetlands, streams, and their associated buffers. In addition, construction activities will occur in areas containing wildlife habitat. The team worked with project engineers to identify where improvements could affect the ecosystems. Prior to finalizing the project footprint, WSDOT modified the design, where feasible, to reduce or avoid effects to wetlands, streams, their associated buffers, and upland habitat. When one of the elements was located within the construction footprint, WSDOT changed the footprint to avoid the element or, if the element could not be avoided, WSDOT determined to what degree project construction will affect ecosystem elements. Based on this information, WSDOT incorporated measures into the project to minimize or avoid the identified effects. These measures are described in Chapter 6.

Exhibit 5-10. Habitat Conditions and Salmonid Distribution in Study Area Streams

Stream Name	Washington State Department of Natural Resources (WDNR) Stream Type	Confirmed Fish Use	Presumed Fish Use
Unnamed Tributary to Fairweather Bay	Type F	None	None
Fairweather Creek	Type F	Coho salmon downstream of SR 520[a,b] Cutthroat trout upstream of SR 520[a,g]	NA
Cozy Cove Creek	Type F	Cutthroat trout downstream of SR 520[c]	Coho salmon
West Tributary to Yarrow Bay wetlands	Type F (downstream of SR 520)	None	Coho salmon and cutthroat trout downstream of SR 520
East Tributary to Yarrow Bay wetlands	Type F (downstream of SR 520)	None	Coho salmon and cutthroat trout downstream of SR 520
West Tributary to Yarrow Creek	Type F	Cutthroat trout upstream of SR 520[c] Coho salmon upstream of SR 520[d,g]	NA
Yarrow Creek	Type F	Cutthroat trout to near headwaters[b,d,e] Coho downstream of SR 520[c,d,f]	NA
East Tributary to Yarrow Creek	Type F	None	Cutthroat trout
South Fork Yarrow Creek	Type F	None	Cutthroat trout downstream of SR 520

[a] Anderson and Ray et al. 2001
[b] StreamNet 2009
[c] 2002 electrofishing associated with SR 520 stream investigations
[d] City of Bellevue 2001
[e] WDFW 2009
[f] Williams et al.1975
[g] King County et al. 2001

Wetlands

Approximately 1.4 acres of wetland will be temporarily affected by construction of the project. Approximately 0.9 acre of wetland buffer will also be affected by construction-related activities. Temporary effects to wetlands and wetland buffers will result from installation of temporary structures, placement of temporary fill for roads or staging, and clearing activities in adjacent portions of the right of way. Wetlands and wetland buffers temporarily affected by construction activities will be restored and replanted with appropriate native vegetation.

Wildlife and Habitat

A total of approximately 14 acres of wildlife habitat will be temporarily affected by the project. Of the 14 acres affected, 13 acres are Urban Matrix and 1 acre is Parks and Other Protected Areas. The temporary effects to wildlife habitat will result from vegetation clearing associated with stream channel alteration and rehabilitation activities. It is not anticipated that temporary clearing of vegetation will result in long-term effects on wildlife habitat or wildlife populations.

Noise and associated construction activity can disturb wildlife. In general, most animals in areas adjacent to the study area are adapted to urban conditions and highway noise. However, loud construction activities could temporarily displace some animals or prevent them from using adjacent habitats. Noise levels will decrease with distance from the construction area. In most cases, noise levels at distances of 750 to 1,000 feet from areas of active construction will be similar to existing ambient noise levels. The likelihood of displacing or disturbing nesting activities of federally and state protected birds – principally bald eagles, great blue herons, and red-tailed hawks – is expected to be low because previously-recorded nests are located approximately 700 feet or more from the construction area.

Fish and Aquatic Habitat

The team evaluated construction effects on fish and aquatic species, as well as their habitat, by determining construction actions that might temporarily disturb in-water sediments and fish passage. The team also evaluated the potential for

accidental spills of hazardous materials that could reach project area streams.

Under the Build Alternative, water quality in streams could be affected by construction activities such as replacing or extending culverts and installing retaining walls or stormwater outfalls below the ordinary high water mark. Construction activities occurring within or directly adjacent to streams could increase the amount of soil and other particles suspended in the water. Streams that could be affected are those crossing or flowing adjacent to SR 520, where construction work must take place in the water (below the ordinary high water mark) or adjacent to or above water bodies in the study area.

The **ordinary high water mark** is the highest water level that is so common and maintained for a sufficient time in all ordinary years that it leaves evidence on the landscape, such as a clear and natural line impressed on the bank, changes in soil character, destruction of or change in vegetation, or the presence of litter and debris.

These effects will be avoided and minimized through the development and implementation of temporary erosion and sediment control (TESC) and spill prevention control and countermeasures (SPCC) plans.

In addition, construction will require substantial in-water work within project vicinity streams, including temporary stream bypasses and dewatering of stream reaches. The in-water work area will be separated from the existing stream with a cofferdam (constructed of sandbags or sheet piling) to minimize the introduction of runoff or sediment into the stream channel during installation and operation of the stream diversion. Prior to any in-water work associated with the diversion inlet, the diversion location will be screened-off with upstream and downstream block nets, and all fish will be removed within the work area. All fish exclusion and removal activities will follow NOAA Fisheries-approved WSDOT protocols for these activities (WSDOT 2009a). With these techniques and application of appropriate BMPs, minimal disturbance to fish populations is anticipated, although individual fish could still be harmed.

Project construction will require clearing of riparian buffers for construction access. During construction, about 3.23 acres of riparian vegetation will be cleared along several streams.

Temporary clearing of vegetation along affected stream corridors could result in a short-term reduction of in-stream cover, which would have adverse effects on fish. Temporary effects would occur until plants installed in the affected stream

corridors are established. Growth rates differ among vegetation types and species, and depend on soil and other habitat conditions. Generally, emergent vegetation takes one year to establish, whereas woody vegetation (for example, shrubs) can take several years to become established. Trees could take 10 years or more to produce vegetation cover similar to existing conditions. The equivalent habitat function for the plantings may vary over time until similar vegetation cover that exists today is achieved. Although the existing riparian conditions along the streams vary, the majority of streams have riparian buffers that are already moderately to severely degraded. The existing buffers of streams with the greatest amount of project effects consist primarily of non-native vegetation such as reed canarygrass, and the affected areas are relatively small when compared with the amount of overall buffer for the individual streams. Based on these factors, many of the functions that riparian vegetation provides (such as large woody debris [LWD] recruitment, contribution of organic material, and regulation of stream temperatures) are already altered and will not be substantially affected compared with existing conditions.

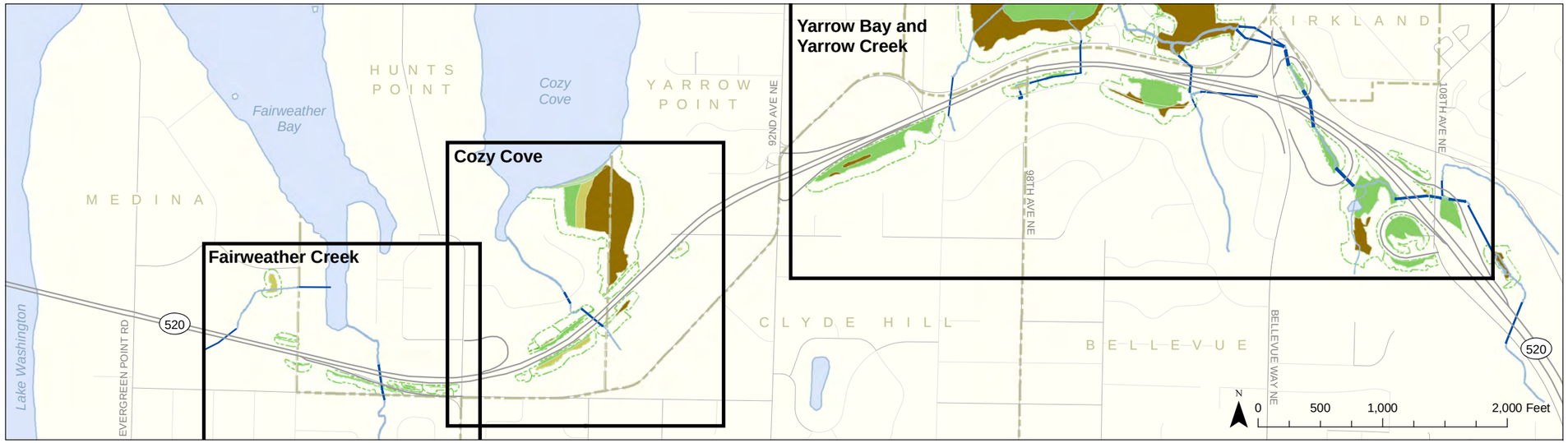
Furthermore, all riparian buffer areas that undergo temporary clearing for construction will be fully revegetated following completion of construction activities. Native trees and shrubs, including fast-growing species such as willows, will be planted, and maintenance and monitoring procedures will be followed to ensure proper levels of plant survival and cover, ultimately resulting in an improved riparian zone condition with increased densities of native shrubs and trees.

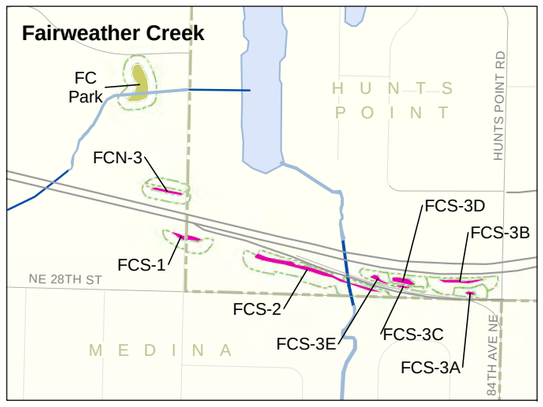
How will project operation affect ecosystems?

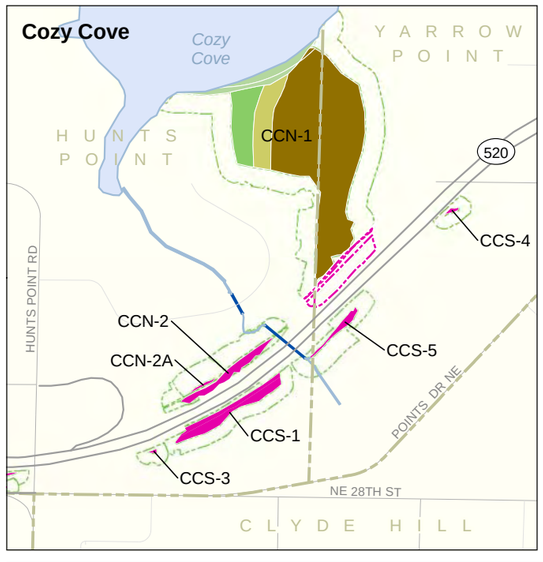
Operational effects refer to effects associated with the installation and operation of permanent facilities, such as the new roadway and stormwater facilities, in or adjacent to wetlands and wetland buffer, streams and riparian buffer, and wildlife habitat.

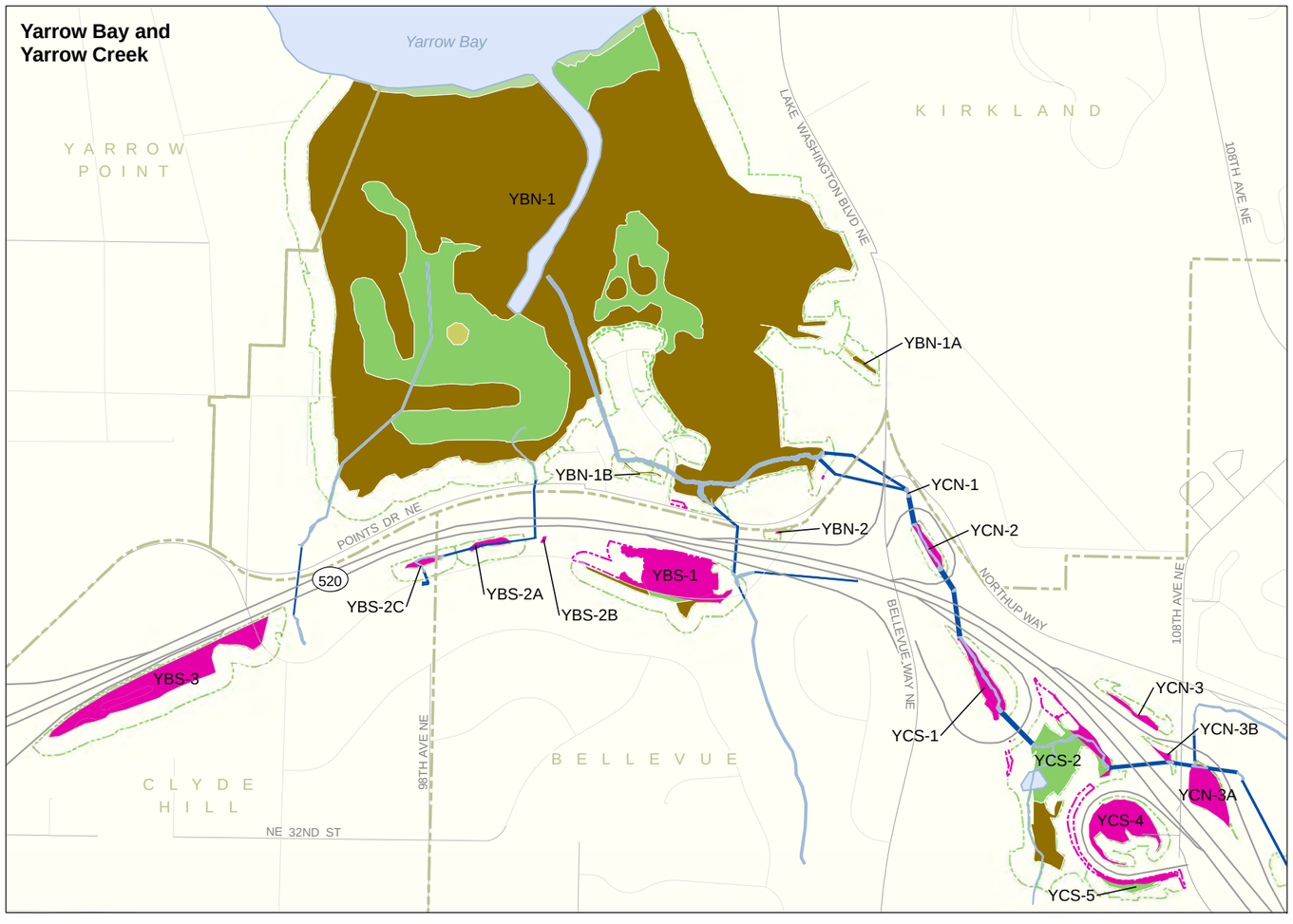
Wetlands

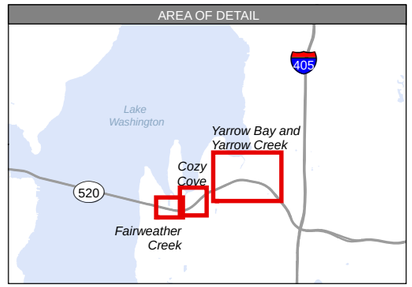
The project will permanently affect 30 wetlands (approximately 7.0 acres). Of the affected wetlands, 22 wetlands will be completely filled and 8 wetlands will be partially filled. Exhibit 5-11 shows the wetlands affected by the project.











Affected Wetlands and Buffers

- Affected Wetland
- Affected Wetland Buffer

Wetland Vegetation Class

- L2AB (Aquatic Bed)
- PFO (Palustrine Forested)
- PSS (Palustrine Scrub-shrub)
- PEM (Palustrine Emergent)
- Wetland Buffer
- Jurisdictional Boundary
- Stream
- Culvert

N 0 250 500 1,000 Feet

Source: King County (2005) GIS Data (Street), King County (2007) GIS Data (Waterbody), CH2M HILL (2008) GIS Data (Stream and Park), Parametrix (2008 and 2009) GIS Data (Wetland and Culvert), and City of Bellevue (1999) GIS Data (City Limits). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-11. **Effects of the Build Alternative on Wetlands**

Medina to SR 202: Eastside Transit and HOV Project

Wetlands that will be completely filled are riverine, depressional, and slope wetlands that contain emergent, scrub-shrub, and forested plant communities. The eight wetlands that will be partially filled are riverine, lake-fringe, and depressional wetlands. The filling of most of these wetlands will be a result of widening SR 520. Approximately 1.7 acres of wetland buffer will be permanently disturbed.

Detention and treatment of stormwater runoff from new and existing roads will affect wetland functions to varying degrees. Hydrologic functions (for example, reducing flooding and erosion) will likely not be affected because the Build Alternative will be designed according to the *Highway Runoff Manual* (WSDOT 2008a). Potential for impacts to groundwater recharge through the creation of new impervious surface is anticipated to have negligible effects due to local conditions and project design elements. The amount of wetland area available to provide water quality functions will be reduced; however, stormwater facilities constructed and treatment of stormwater runoff that is currently not treated will partially offset the loss of water quality functions provided by wetlands in the study area.

Habitat functions (for example, cover, foraging, breeding, and/or nesting habitat) provided by wetlands in the study area, especially depressional and riverine wetlands, will be affected. The amount of cover and foraging, breeding, and/or nesting habitat for invertebrates, amphibians, some (non-wetland) birds, and mammals that occasionally use these wetlands could be affected.

However, WSDOT will provide mitigation to compensate for wetlands and their functions including adverse effects on water quality, hydrologic, and habitat functions in the study area. Mitigation will result in no net loss of wetland functions.

Wildlife and Habitat

A total of 65 acres of wildlife habitat will be permanently affected by the project through the conversion of pervious surfaces to impervious surfaces. Of the 65 acres, 61 acres is Urban Matrix, representing 6 percent of this existing habitat type. In addition, 4 acres, or 4 percent of existing Parks and Other Protected Areas habitat type, will be affected. The amount of habitat affected will be relatively small compared

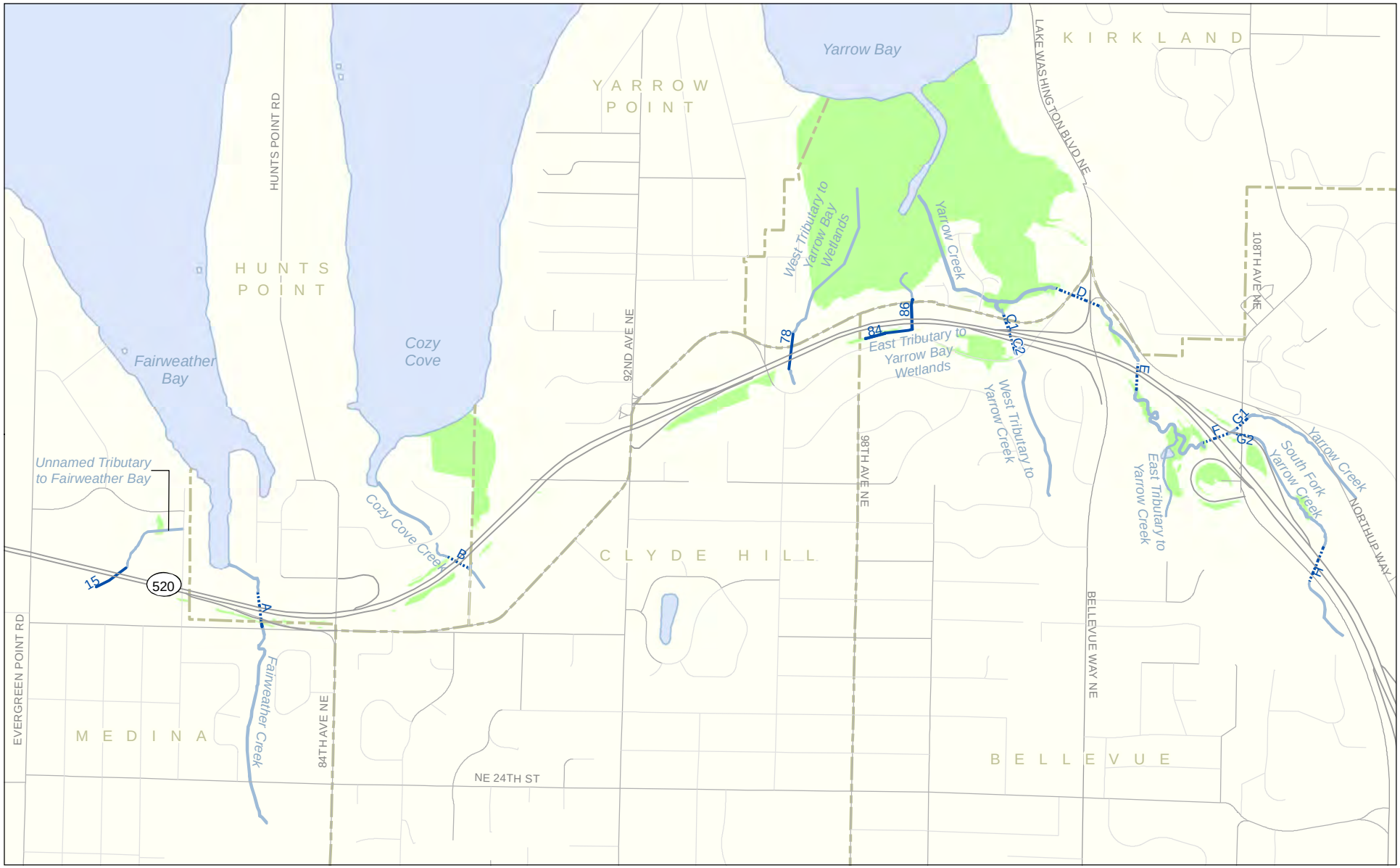
with the total amount available within and adjacent to the study area. Effects on wildlife from the loss of upland trees and shrubs may include a loss of forage and cover for urban-adapted species as well as a reduction in intact vegetated corridors connecting wildlife habitats in the study area. Affected animals may find adequate habitat adjacent to the affected area or may be displaced to areas away from the roadway. Affected species are common and abundant in the study area, and adverse effects on the larger populations of these animals in the project vicinity are not anticipated.

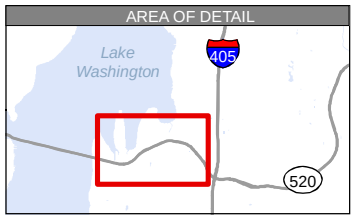
Noise walls constructed as part of the project will reduce noise disturbance to urban-adapted species in the study area, especially birds. Construction of larger culverts will provide enhanced opportunities for wildlife to move under the freeway without direct interaction with traffic. Operation of the highway will not likely affect the habitat or behaviors (for example, foraging, breeding, or nesting) of federal, state, or local sensitive wildlife species.

Fish and Aquatic Habitat

The Build Alternative will remove and replace culverts on study area streams to accommodate widening of the roadway. In addition, stream channels will be realigned and buffers will be revegetated.

A total of 17 culverts will be affected under the Build Alternative. See Exhibit 5-12 for streams where culverts will be removed and replaced. Six existing culverts will be completely removed and open channel restored. Nine other structures, which are existing fish passage barrier culverts, will be replaced with fully fish-passable structures. Two existing fish passage barriers will be extended, but not upgraded to provide fish passage per a memorandum of agreement between WSDOT and the Washington Department of Fish and Wildlife (WSDOT and WDFW 2008). For one of these, road widening will eliminate upstream areas south of SR 520 associated with the East Tributary to the Yarrow Bay Wetland. The other structure connects segments of the West Tributary to the Yarrow Bay Wetland, however improving this structure to fish passable status would provide minimal gain for fish because only a small amount of habitat exists south of SR 520 and would be complicated by the steep gradient between the stream segments south and north of SR 520.





Proposed Culvert (Structure ID)

Existing Culvert (Structure ID)

Proposed Stream

Wetland

Jurisdictional Boundary

N

0 500 1,000 2,000 Feet

Source: Parametrix (2009) GIS Data (Wetlands and Culverts), King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.

Exhibit 5-12. **Proposed Stream Alignments and Culvert Locations**

Medina to SR 202: Eastside Transit and HOV Project

\\SIMBA\PROJ\PARAMETRIX\180171\GIS\MAPFILES\EA\EA\CH5\EA_CH5_PROPOSEDSTREAM_8X11.MXD 10/6/2009

A third culvert conveying water to the headwaters of the Unnamed Tributary to Fairweather Bay will also be extended to accommodate road widening. Since no upstream habitat currently exists, the culvert will not be upgraded to provide fish passage.

Culverts and Stream Realignments

To the extent possible, project design will avoid and minimize loss of open stream channel, as well as upgrade fish passage structures within the right of way that convey fish-bearing streams. Overall, fish passage conditions will improve on five streams; whereas today, SR 520 acts as a barrier to fish. Project-wide, channel realignments and culvert removals and replacements will result in a gain of 820 linear feet of open channel habitat within fish-bearing streams, including daylighting approximately 787 linear feet of stream channel currently confined in culverts (see Exhibit 5-13). The overall results of the stream crossing improvements and the channel realignments will be a substantial net increase in both instream habitat quality and quantity within the study area.

Daylighting refers to the restoration of a natural or artificial channel to a stream segment that was previously confined to a culvert.

To the extent possible, project design will avoid and minimize loss of open stream channel, as well as upgrade fish passage structures within the right of way that convey fish-bearing streams. However, two fish passage barrier culverts will be extended or replaced, but not upgraded to fish passage status due to limited low quality habitat upstream of SR 520 which would provide extremely minimal gains for fish. Outlet protection will be provided to minimize erosion at the outlet. One of the existing culverts is perched and creating downstream channel instability. Improvements associated with that culvert outlet will reduce erosion and downstream sedimentation, and will improve downstream substrate conditions. Effects due to the erosion measures will be mitigated.

Culverts extended, but not upgraded to fish passage status currently connect non-fish habitat upstream of SR 520 with fish habitat downstream of SR 520. While some stream functions will be affected by the filling of these stream segments and confining them to culverts, these stream functions will be offset (1) by stream enhancements, including daylighted stream channel and increased stream length resulting from restored meanders to previously-straightened

stream segments; (2) by adding large woody debris to streams that currently lack habitat complexity; and (3) by improving stream buffers. Furthermore, fish passage improvements will provide fish with access to considerably more stream habitat following completion of the project. These improvements will result in higher quality stream habitat and greater fish access as a result of the project.

The Build Alternative will result in a long-term improvement in fish passage and in in-stream habitat conditions. These improvements will benefit fish and aquatic resources by creating additional rearing and migration habitat and by improving access to this area. All native fish species present in the study area will benefit, including salmonids such as cutthroat trout.

Exhibit 5-13. Effects of the Build Alternative on Eastside Culvert Crossings

Stream	Is Affected Stream Fish-Bearing? (Yes/No)	Net Change in Number of Culverts within Stream	Net Change in Length of Stream Confined in Culvert (linear feet)[a]	Net Change in Open Channel Length of Stream (linear feet)[a]
Fairweather Creek	Yes	-1	-28	+17
Unnamed Tributary to Fairweather Bay	Yes	0	+57	-63
Cozy Cove Creek	Yes	0	-6	-36
Tributary to Cozy Cove Creek	No	0	0	-10
West Tributary to Yarrow Bay wetlands	Yes	0	+58	-109
East Tributary to Yarrow Bay wetlands	No	0	+125	-195
West Tributary to Yarrow Creek	Yes	1	-9	-87
Tributary of West Tributary to Yarrow Creek	No	0	0	-84
Main Stem Yarrow Creek	Yes	-4	-488	+724
East Tributary to Yarrow Creek	Yes	0	0	+5
South Fork Yarrow Creek	Yes	-1	-496	+658
Totals		**-5**	**-787**	**+820**

[a] Negative numbers indicate that the channel length confined to a culvert or open channel would decrease. Please note that the realignment of culverts results in differences between culvert length added/lost and open channel added/lost.

Riparian Vegetation

Removing streamside vegetation to construct the expanded roadway will reduce the amount and quality of LWD recruited to streams, reduce stream shade that in turn could increase stream temperatures, and destabilize stream banks, thus adding to stream bank erosion. Effects due to project operation on regulated riparian buffers will occur along three streams in the study area, totaling approximately 2.13 acres.

Depending on the stream, the amount of permanent buffer that will be removed because of placement of fill will range from less than 0.01 acre to 0.92 acre under the Build Alternative. Clearing of vegetative material along affected stream corridors could temporarily reduce in-stream cover, which could have adverse effects on fish. Temporary effects would occur until plants installed in the affected stream corridors are established. Growth rates differ among vegetation types and depend on soil and other habitat conditions. Generally, emergent vegetation takes one year to establish, whereas woody vegetation (for example, shrubs) can take several years to become established.

What will happen to ecosystems if WSDOT does not build this project?

Wetlands

No wetland or wetland buffers will be filled or cleared under the No Build Alternative. Wetlands will likely continue to be maintained (mowed) within the SR 520 right of way, which decreases the habitat quality. The No Build Alternative will not change the amount of impervious surface in the study area, and no changes to hydrologic functions are expected. Currently, water runs off SR 520 directly into streams and wetlands. The No Build Alternative will continue to not treat runoff from the roadway, which has a continuing negative effect on water quality and habitat downstream from SR 520.

Wildlife and Habitat

No vegetation will be removed under the No Build Alternative. No changes to wildlife habitat will occur under the No Build Alternative since no vegetation will be removed. No changes in disturbance to wildlife species will occur, except for increases in noise from increased roadway traffic

over time. Wildlife movement under the freeway will continue to be impeded by existing barriers, for example, undersized culverts.

Fish and Aquatic Habitat

No physical changes to streams or Lake Washington will occur under the No Build Alternative. The amount of untreated stormwater runoff from SR 520 will remain unchanged and existing fish passage barriers within the stream will likely persist. However, traffic volume is expected to increase in the future, which could result in a corresponding increase in the release of stormwater pollutants into the aquatic environment. This could have a negative effect on water quality. In-stream fish habitat conditions are not expected to change substantially under the No Build Alternative.

CHAPTER 5.3 Energy

When energy is used to build something or operate a vehicle, it cannot be recovered. Project construction activities and the operation of vehicles on SR 520 consume large amounts of energy resources, particularly petroleum. Energy will be consumed during project construction by activities such as site preparation, equipment operation, and construction lighting.

Please refer to the Energy Technical Memorandum in Appendix M for additional information about the energy analysis.

Why is energy use considered in this EA?

The National Environmental Policy Act (NEPA) requires agencies to consider environmental effects when making decisions about the project.

Washington state has adopted greenhouse gas (GHG) reduction goals (Revised Code of Washington [RCW] 70.235.020). As part of its plan to reduce GHG emissions, the State has also adopted vehicle miles traveled (VMT) benchmarks (RCW 147.01.440) as one strategy to reduce transportation sector GHG emissions. Guidance on how to address GHG emissions in environmental documents prepared to meet the State Environmental Policy Act (SEPA) requirements is currently being developed. In the meantime, WSDOT is evaluating GHG emissions according to its *Guidance for Project-Level Greenhouse Gas and Climate Change Evaluations* (WSDOT 2009b).

The energy analysis estimated the amount of energy that will be consumed during project construction and the amount of energy that will be consumed by vehicles operating in the study area under both the Build Alternative and No Build Alternative.

How was information collected and what methods were used to evaluate effects?

The project team investigated energy use characteristics at both the state level and the project level. Where detailed information about energy use in the project vicinity was not available, the project team used state-level trends to help describe energy consumption at the local level. The analysis

focused on energy use associated with the proposed project and study area and did not consider energy-related effects to refineries or utilities.

The team used the guidance in Chapter 440 of WSDOT's *Environmental Procedures Manual* (WSDOT 2008b) to estimate the likely energy-related effects of the alternatives. The project team also used information provided in *Energy and Transportation Systems*, a report by the California Department of Transportation (CALTRANS 1983).

During construction of the proposed project, energy will be consumed by site preparation and construction activities, including equipment operation and construction lighting. The team used construction cost estimates provided by WSDOT to calculate energy consumption during the construction period. The analysis focused on energy use associated with the proposed project and project site.

The team then estimated the amount of energy consumed by vehicles using the facility on a broad level to approximate the amount of energy used by each alternative. Energy consumption estimates were based on travel forecasts generated by the traffic analysis (see Appendix Q, Transportation Discipline Report). The direct effects analysis includes energy consumption calculations using VMT as an indicator of volume and energy consumption rates and as an indicator of energy use. The analysis does not include the variables of traffic operations at interchanges, arterials, or local intersections.

To convert million British thermal units (MBtu) to gallons of gasoline, the total MBtu values for passenger vehicles were divided by 124,000. To convert MBtu to gallons of diesel, the total MBtu values for heavy trucks and transit buses were divided by 139,000.

What are the characteristics of the study area?

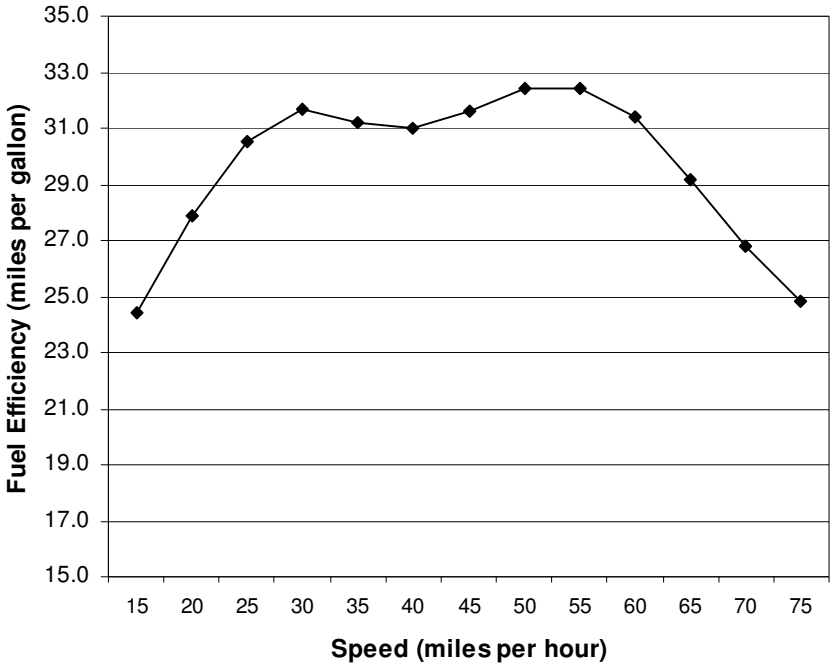
The study area for the energy analysis is the same as the study area for the traffic operations analysis—the SR 520 highway and local interchanges from the east side of the Lake Washington shoreline to the SR 520/SR 202 interchange. The study area includes the entire SR 520 corridor because the

traffic model included all vehicle trips across Lake Washington from the beginning of the trip at one end of SR 520 to the other end of SR 520. For example, if a passenger vehicle was traveling from Redmond to Seattle via SR 520, the entire trip along the SR 520 corridor was included in the traffic data and used in the energy analysis.

The SR 520 corridor is heavily used and frequently congested with traffic because it is one of only two crossings that serve residents, commuters, and other travelers across Lake Washington. The corridor is home to some large organizations whose employees and customers travel SR 520 to get to and from their places of work or destination. SR 520 is also considered a freight route. The congestion level indicates that the available roadway capacity is fully used, and traffic is forced to operate at lower speeds and with limited maneuverability.

Excessive idling and stop-and-go traffic conditions substantially reduce fuel economy compared with free-flow conditions. Because of the current conditions in the study area, there are many times throughout the day when the study area is congested and vehicles operate at inefficient speeds. Exhibit 5-14 shows the average miles per gallon (mpg) for cars and pickups traveling at speeds of between 15 and 75 miles per hour (mph). The data presented in Exhibit 5-14 are based on the results of an FHWA test and are presented for illustrative purposes to show the effect of vehicle speed on fuel efficiency. As shown, fuel efficiency is greatest when passenger vehicles are traveling between 30 and 55 mph.

Because of traffic congestion, the existing average travel speed of all vehicles driving in the study area is 29 mph. According to the Transportation Discipline Report (see Appendix Q), vehicles drive approximately 1.7 million miles daily along the SR 520 corridor, for an annualized estimate of 562 million miles. Nearly 4.0 million British thermal units (Btu) of energy are consumed by vehicles in the study area each year. Approximately 31.2 million gallons of fuel are consumed each year in the study area.



Source: DOE (2008)

Exhibit 5-14. Average Automobile Fuel Consumption Rate

How will project construction temporarily affect energy use?

During construction of the proposed project, energy will be consumed by site preparation and construction activities, including equipment operation, and by providing construction lighting.

The amount of energy used during project construction will be roughly proportional to the size and cost of the project. The construction cost for the Build Alternative in 2012 dollars is estimated at $581,000,000. The project will consume approximately 2.8 MBtu. The energy consumed during construction will be spread out over the entire construction period of approximately 4 years.

How will project operation permanently affect energy use?

Operational effects were calculated using the total energy consumed by cars, heavy trucks, and transit buses post-construction and total VMT. During operation, annual VMT in the study area under the Build Alternative will be approximately 805 million based on 2030 projections. By comparison, the VMT under the No Build Alternative will be approximately 806 million, or 0.1 percent more than for the Build Alternative.

What are greenhouse gas emissions?

Vehicles emit a variety of gases during their operation; some of these are GHGs. The GHGs associated with transportation are water vapor, carbon dioxide (CO_2), methane (also known as "marsh gas"), and nitrous oxide (used in dentists' offices as "laughing gas"). Any process that burns fossil fuel releases CO_2 into the air. CO_2 makes up the bulk of the emissions from transportation.

Vehicles are a major source of GHG emissions and contribute to global warming, primarily through the burning of gasoline and diesel fuels. National estimates show that the transportation sector (including on-road vehicles, construction activities, airplanes, and boats) accounts for almost 30 percent of total domestic CO_2 emissions. However, in Washington state, transportation accounts for nearly half of GHG emissions because Washington relies heavily on hydropower for electricity generation. Most other states rely on fossil fuels such as coal, petroleum, and natural gas to generate electricity. The next largest contributors to total GHG emissions in Washington are fossil fuel combustion in the residential, commercial, and industrial sectors at 20 percent; and electricity consumption, also 20 percent. Exhibit 5-15 shows the gross GHG emissions by sector, nationally and in Washington state.

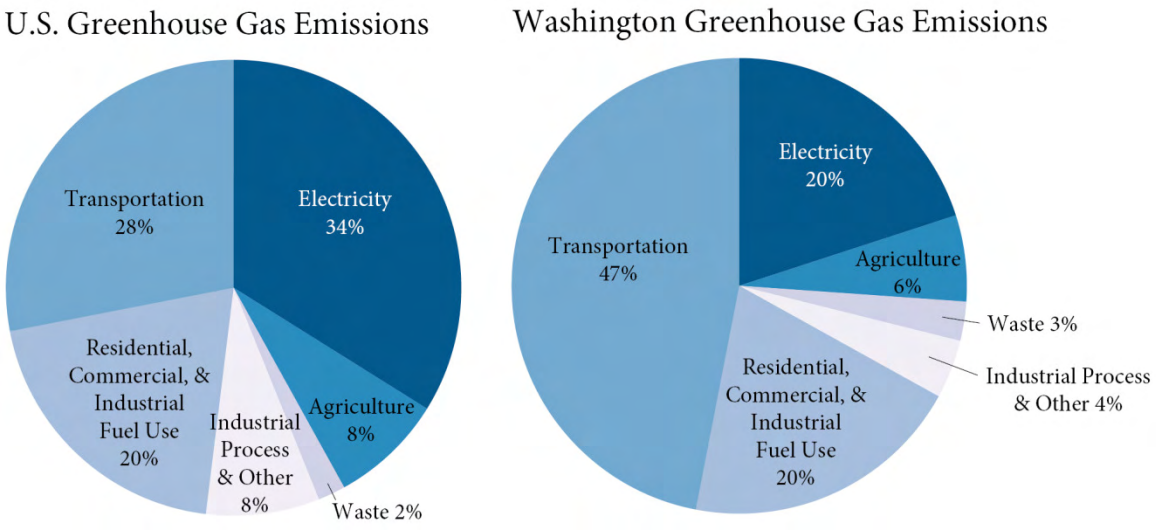


Exhibit 5-15. Greenhouse Gas Emissions by Sector, U.S. and Washington State (Ecology and CTED 2007)

Efforts to Reduce Greenhouse Gas Emissions in Washington State

In 2007, Governor Gregoire and the Washington State Legislature set GHG reduction goals for Washington state:

- 1990 greenhouse gas levels by 2020
- 25-percent reduction below 1990 levels by 2035
- 50-percent reduction by 2050

Also in 2007, the Climate Advisory Team was formed by Governor's Executive Order 0702 to find ways to reduce GHG emissions. The final report included 13 broad recommended actions.

The Legislature passed and the Governor signed House Bill 2815 in spring 2008. This bill includes, among other elements, statewide per capita VMT reduction goals as part of the state's GHG emission reduction strategy.

This bill also established the Climate Action Team, a group similar to 2007's Climate Advisory Team. This group refined the 2007 broad recommendations into specific actions the state can take to reduce emissions. WSDOT worked as a member of this group on strategies to reduce VMT and on how to include climate change in SEPA evaluations.

In addition to working with others in Washington state, WSDOT is leading the development of effective, measurable, and balanced emission reduction strategies. Current WSDOT activities that reduce GHG emissions include the following:

- **Transportation Options.** For 30 years, WSDOT has supported carpooling, vanpooling, and public transportation through the funding, building, and maintenance of the freeway HOV system, ferries, rail, and other programs. WSDOT's Commute Trip Reduction program has been partnering with employers to offer alternatives to drive-alone commuting for 17 years, and WSDOT has the nation's largest public vanpool program. These programs continue to expand, and with recent high gas prices demand for these programs has surged. These investments help reduce the number of vehicles on the roadway during peak congestion and help reduce VMT.
- **Incident Response Team (IRT).** WSDOT has 55 vehicles that patrol 500 miles of highway to clear blocking incidents quickly and safely. IRT clears 98.6 percent of all incidents in less than 90 minutes, reducing the amount of time motorists spend sitting and idling in traffic.
- **Using Biodiesel in Ferries.** Each year, the state ferry system burns approximately 17 million gallons of diesel fuel in its ferries, making the agency a significant fuel consumer in Puget Sound. In March 2008, Washington State Ferries began testing the use of biodiesel in the marine environment. Using biodiesel instead of traditional petroleum-based fuels reduces emissions of particulate matter and GHGs, improving both local air quality and the earth's climate.

In addition to working to reduce emissions on the transportation network, WSDOT is also taking action to reduce the agency's emissions. Steps include the following:

- **No Idle Policy.** In 2006, WSDOT adopted a no-idle policy to reduce fuel use and vehicle emissions. WSDOT estimates that by reducing vehicle idling by 50 percent, the agency can save as much as $500,000 annually in fuel costs.
- **Reducing diesel emissions.** In 2005, WSDOT started using 5-percent biodiesel mixed with regular diesel in maintenance vehicles operating in the Central Puget

Sound area. Currently, 25 WSDOT fueling stations have 10-percent biodiesel available, and WSDOT is working toward using 20-percent biodiesel, depending on availability.

WSDOT and its partners are also actively implementing the 2005 Transportation Partnership Act, a 16-year plan to meet Washington state's most critical transportation needs. Many of these local, regional, and statewide transportation system improvements, in conjunction with ongoing programs, help to reduce the number of miles that vehicles need to travel each year. Together, these efforts combine to create more efficient driving conditions, offer mode choices, and help move WSDOT toward state GHG reduction goals.

How much greenhouse gas will the project produce during construction?

It is estimated that project construction will produce 209,000 metric tons (MT) of carbon dioxide equivalent (CO_2e) emissions. These emissions will be spread over the duration of construction.

The emissions estimate is based on the results of the energy analysis. Since the energy analysis is based on applying an energy conversion factor to project costs, GHG emissions are directly proportional to project costs. This methodology does not rely on an in-depth analysis of construction techniques and equipment. Actual emissions will depend on the type of equipment used and construction methods chosen.

How much greenhouse gas will be produced during project operation?

Exhibit 5-16 shows the total estimated CO_2e emissions produced during peak periods on weekdays (5:30 am to 10:15 am and 3:00 pm to 7:45 pm). These periods were compared because they are the most congested times of day. Congestion decreases fuel economy and increases GHG emissions. Changes in the roadway configuration will have the greatest effect on traffic during these time periods because of the large number of vehicles on the road and greater likelihood for congested conditions.

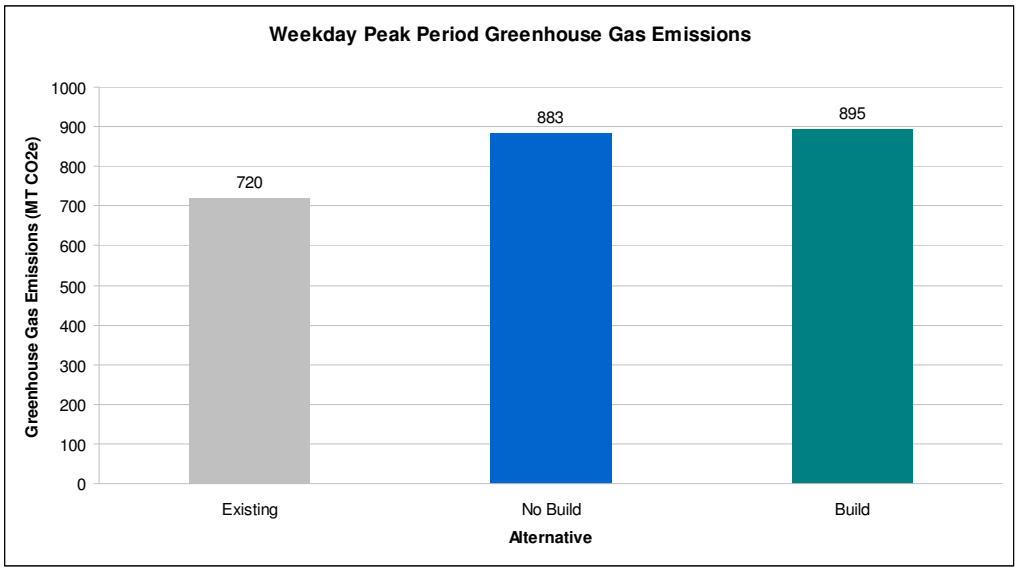


Exhibit 5-16. Daily Peak Period GHG Emissions – Metric Tons Carbon Dioxide Equivalents

The operational emissions values represent only those emissions during the peak periods on weekdays. Additional emissions are released during non-peak hours and on the weekends. Because traffic data were not available for these periods, this analysis does not include these emissions. This data limitation also precludes the calculation of annual GHG emissions for this project. However, since the weekday peak travel hours are the highest CO_2e emitting periods, the daily comparison is expected to reflect annual trends.

Although this analysis does not include any project effects to roadways other than SR 520, it is important to note that conditions on SR 520 influence, and are influenced by, traffic on other roadways in the region. The overall effect of the project on GHG emissions in the region could be lower or higher than the figures reported.

The Build and No Build Alternatives will result in similar quantities of emissions because they will affect traffic in similar ways. With both alternatives, additional traffic leads to increased congestion and more vehicles traveling below 30 mph. Vehicles traveling at below about 30 mph are less efficient than vehicles traveling at somewhat higher speeds.

What will happen to greenhouse gas emissions if WSDOT does not build this project?

Under the No Build Alternative, no road improvements to reduce traffic congestion will be implemented. GHG emissions will be similar for the Build Alternative and the No Build Alternative.

CHAPTER 5.4 Land Use, Economics, and Relocation

Project construction will require WSDOT to acquire about 9.4 acres – full acquisition of 13 parcels and partial acquisition of 23 parcels. An additional 1.3 acres will be temporarily affected during construction. Land use changes will not change the character of the area. Project construction could have minor short-term effects on properties, including increased noise, dust, traffic, and odor from equipment operations, and/or glare from construction lighting.

Please refer to the Land Use, Economics, and Relocation Technical Memorandum in Appendix N for additional information on the land use, economics, and relocation analyses.

The land uses of a community indicate where people live, work, shop, and participate in community activities. Local governments plan for land uses according to the community's long-range vision and goals.

Why are land use, economics, and relocations considered in this EA?

Under the National Environmental Policy Act (NEPA), land use, economics, and relocation effects must be considered in an EA. Transportation projects can have direct, indirect, and cumulative effects on land use and economics. As a result of property acquisition and relocations, these effects may include changes in mobility and access, noise level, air quality, and visual quality both during and after construction. Analyses of land use, economics, and relocations help decision-makers understand the existing conditions within the study area, potential effects to land use or economics caused by the project, any conflicts with land use plans and development regulations, and any potential mitigation measures for addressing those effects.

How was information collected and what methods were used to evaluate effects?

For the land use and relocation analyses, the project team identified the existing land uses using King County Assessor's data, and then verified these land uses by conducting a field survey of the study area. The immediate study area, as defined by the project team, extends a half-mile around SR 520

from the east shore of Lake Washington (Evergreen Point Road) to 1 mile past the SR 202 interchange.

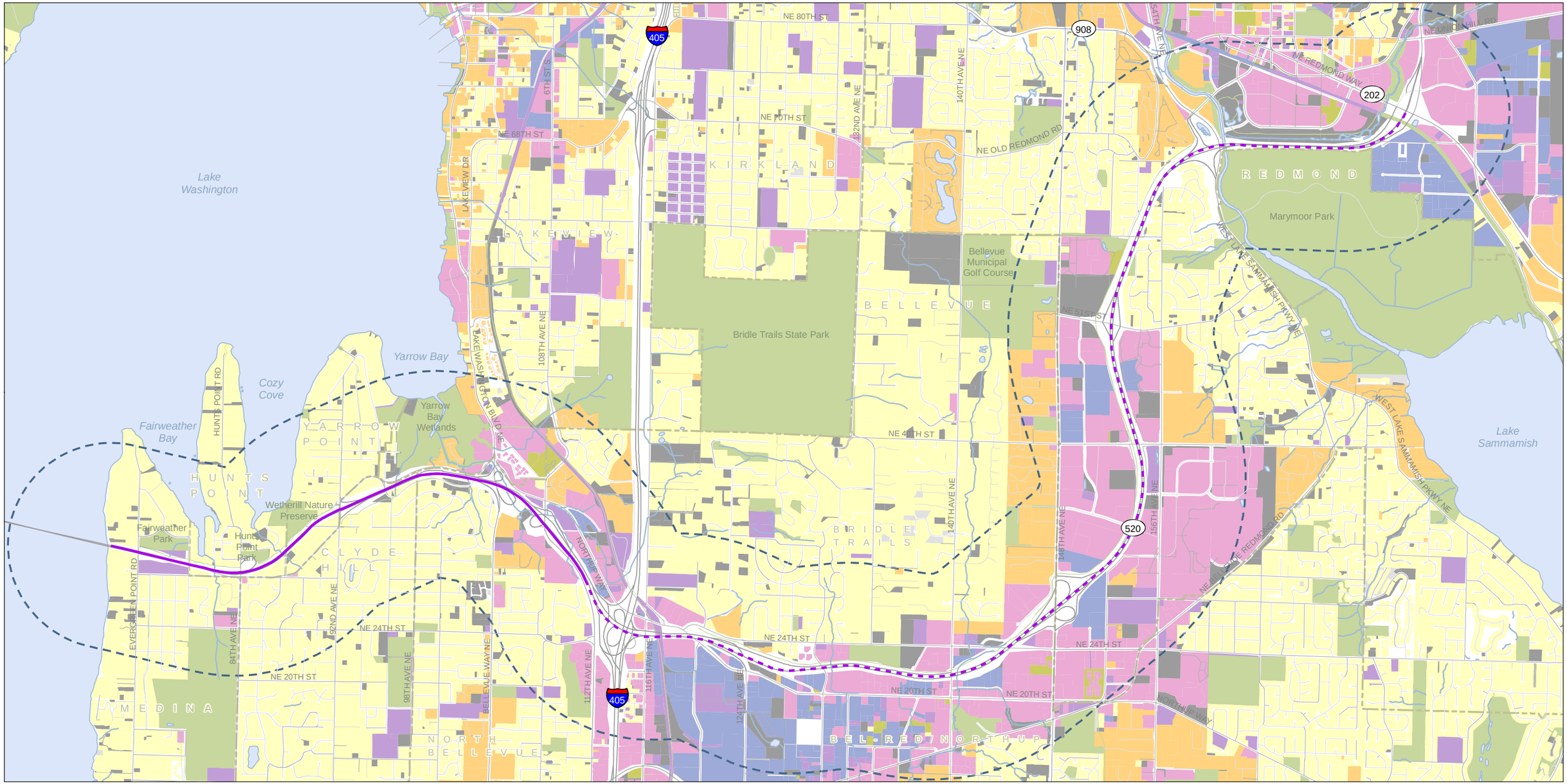
For the economic analysis, the immediate study area also includes Medina, Hunts Point, Clyde Hill, and Yarrow Point (the Points communities); Kirkland; Bellevue; and Redmond. King County was included because of the project's size and its potential regional effects. In addition, Washington state and the U.S. were included for broader comparison purposes.

The project team gathered information about potential future land uses by reviewing the comprehensive plans and zoning codes for the affected jurisdictions. The team obtained demographic and housing information from the 2000 U.S. Census.

For employment forecasts, WSDOT worked with the Governor's Office of Financial Management (OFM) economists to determine an appropriate method to estimate job creation for highway construction projects. With OFM guidance, WSDOT has devised a method to estimate job creation for large multi-year projects based on peak expenditure year and job multipliers from specific to project stages in that year. The methodology accounts for anticipated changes in inflation when estimating employment per dollar expenditure. The multipliers used in preparing the job creation estimates are derived from the OFM Washington State Input-Output Model (Washington State Office of Financial Management 2008).

What are the existing land use and socioeconomic characteristics of the study area?

The majority of the land uses in the study area are single family residential (28 percent), commercial (19 percent), and vacant properties (14 percent), with 5 percent parks and open space. Exhibit 5-17 shows the existing land use, and Exhibit 5-18 shows the existing zoning. The total population in the study area is approximately 183,389 and is composed of 78 percent white, 22 percent non-white, and 5 percent Hispanic. The Asian population represents the largest composition of the non-white population at 14 percent. Bridle Trails is the most diverse community in the study area (percentage of total population).



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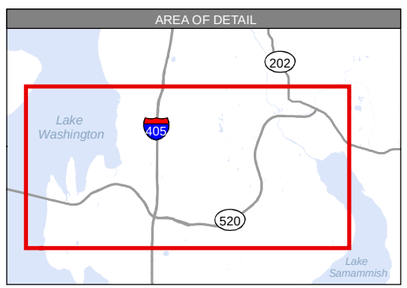

Land Use

- Single Family
- Multi-Family
- Parks/Open Space
- Civic and Quasi-Public
- Commercial
- Industrial
- Parking
- Vacant
- Unknown

- Study Area
- Construction Extent
- Restriping Extent
- City Limits

N

0 1,000 2,000 4,000 Feet

Source: City of Bellevue (2004) GIS Data (Parcel), City of Redmond (2009) GIS Data (Parcel), City of Kirkland (2008) GIS Data (Parcel) King County (2008) GIS Data (Parcel,Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.

Exhibit 5-17. **Existing Land Use**

Medina to SR 202: Eastside Transit and HOV Project

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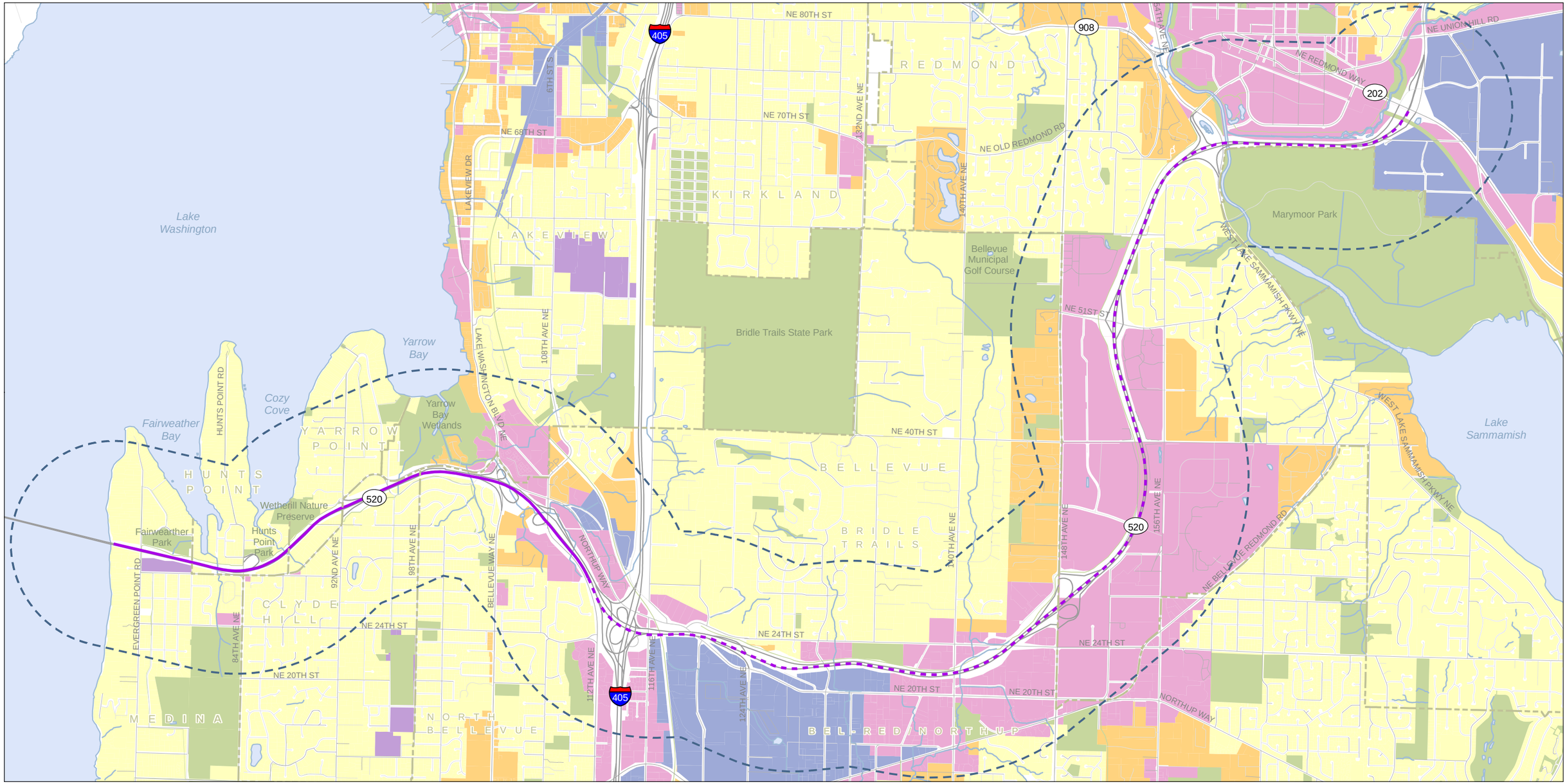

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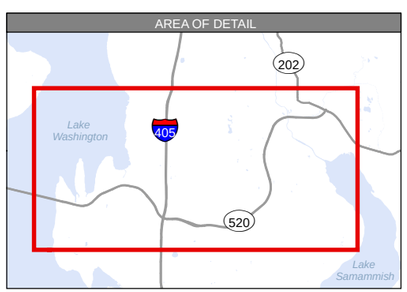

Existing Zoning

- Single Family
- Multi-Family
- Parks/Open Space
- Civic and Quasi-Public
- Commercial
- Industrial

- Study Area
- Construction Extent
- Restriping Extent
- City Limits

N

0 1,000 2,000 4,000 Feet

Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.

Exhibit 5-18. **Existing Zoning**

Medina to SR 202: Eastside Transit and HOV Project

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The Puget Sound Regional Council (PSRC) expects a higher average annual growth in the rate of household formation between 2000 and 2030 in the Eastside communities and in King County than the annual rate of population growth (PSRC 2006). This means that the number of persons per household is expected to decline. This is important because travel demand typically relates more closely to household formation than to population. Median house values in the Eastside communities in 2007 ranged from almost $2 million in Hunts Point to $490,000 in Redmond, which was higher than King County's median house value of $430,000.

Furthermore, Medina, Hunts Point, Clyde Hill, and Yarrow Point are the four cities/town with the highest per capita income in the state according to the 2000 U.S. Census. Median household income in Eastside communities is higher than the county and state averages.

The economic study area is a center of commercial activity on the Eastside with a strong base in the financial, insurance, real estate, and services sector. The Boeing Company is King County's largest employer, followed by Microsoft and the University of Washington. The preliminary unemployment rate in King County as of May 2009 was 8.0 percent (BLS 2009).

The largest sources of tax revenue in the study area are sales taxes, property taxes, and other taxes (business and occupation, utility, and miscellaneous taxes). Bellevue generated the most tax revenue in 2008 ($275 million) followed by Redmond ($124 million) and Kirkland ($104 million). Sales tax is the largest source of tax revenue for Bellevue, Kirkland, and Redmond.

View from Evergreen Point Bridge Looking East Toward Medina. Many single-family homes in Medina are waterfront or view properties, like homes elsewhere in the Points communities.

Is the project consistent with local land use plans and regulations?

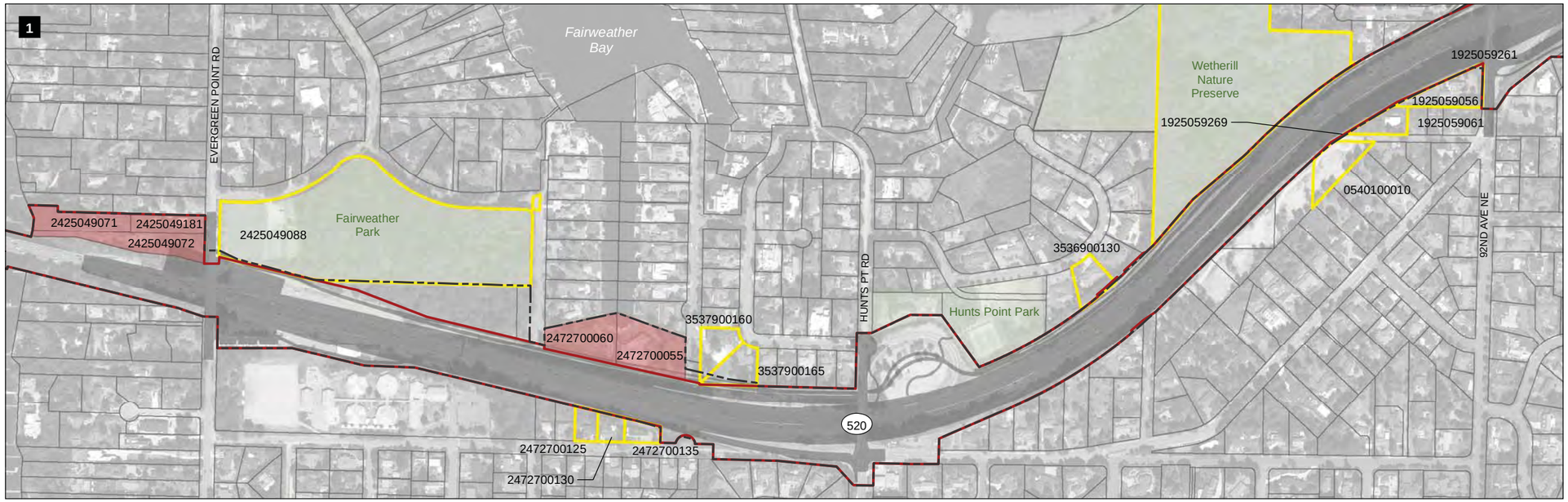
The project team determined the project's consistency with the applicable land use plans by evaluating the Build Alternative and No Build Alternative and assessing whether these alternatives will support the policies that guide land use and transportation decisions in the study area. The Build Alternative is consistent with applicable state, regional, and local plans, and with development regulations. Refer to Appendix N, Land Use, Economics, and Relocation Technical Memorandum for a detailed list of the goals, policies, and development regulations.

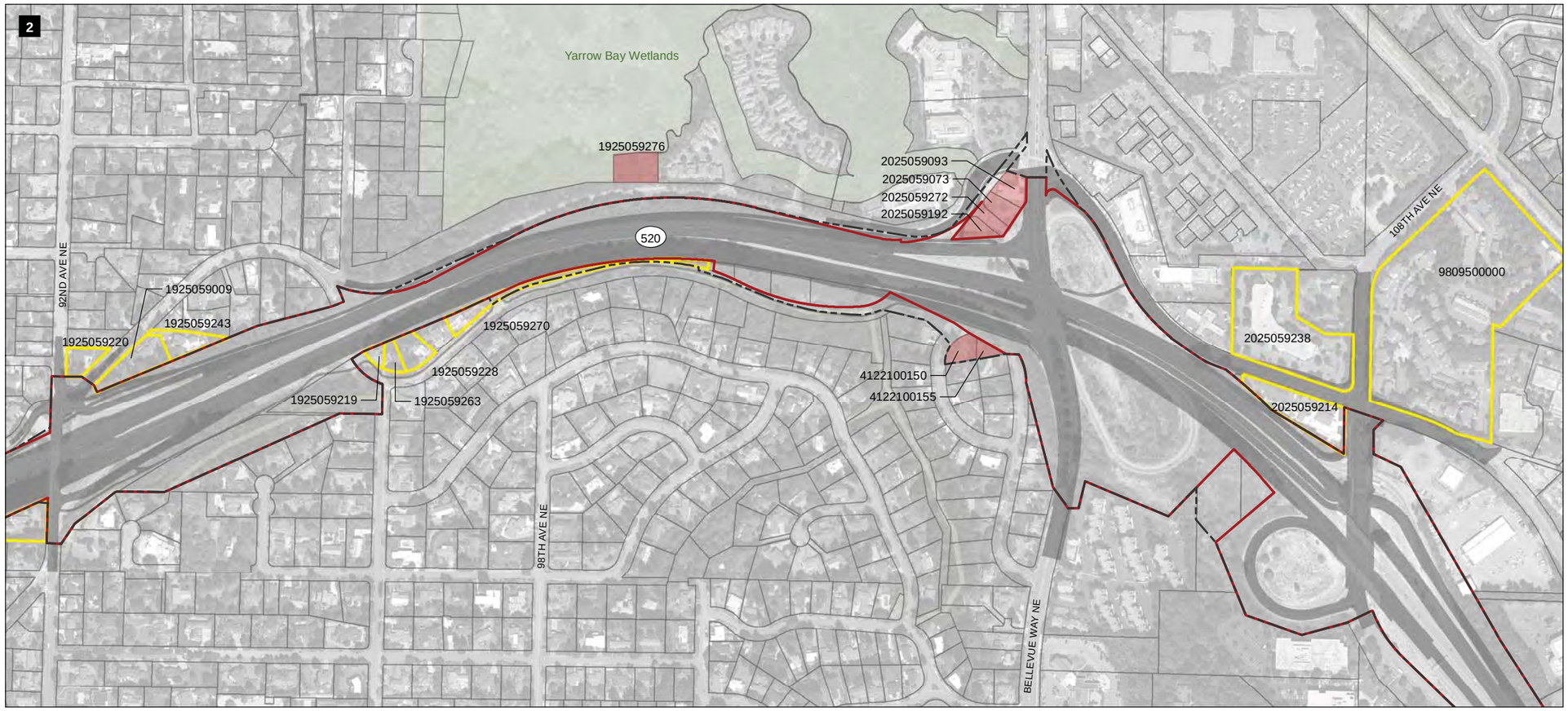
How will the project affect land use, economics, and relocation during construction?

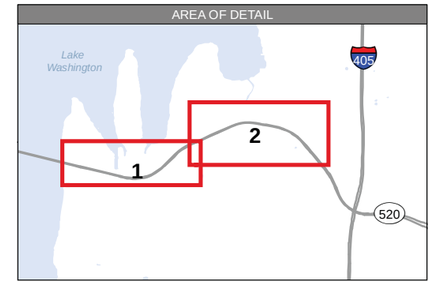
Project effects on land use patterns in the study area and the local economy include the permanent effects of property acquisitions needed for project construction. Exhibit 5-19 shows the acquisition map. Widening of SR 520 will occur mostly within existing WSDOT-owned property with the exception of fully acquiring 13 parcels (5 residences, 6 vacant, and 2 commercial properties) and partially acquiring 23 parcels. Overall, the project will require acquisition of roughly 9.4 acres for right of way (commercial – 0.56 acres; residential – 5.73 acres; vacant – 0.96 acres; other – 2.16 acres).

In May 2009, an Internet search was conducted to identify comparable residential properties with similar characteristics as those that will be displaced. The internet search identified 14 homes in Medina, 3 home in Hunts Point, and 315 properties in Bellevue with a listing price in the range of the assessed values of the properties that would be acquired. Identical replacement housing may be challenging due to the limited number of properties currently undeveloped or available as replacement housing in these areas with similar attributes.

While the affected properties will have a change in land use, this effect is minor compared with the entire study area. Land use is well established outside of the affected properties and is not expected to change as a result of this project.







- Properties Affected by Full Acquisition
- Properties Affected by Partial Acquisitions and Permanent Easements
- Parcel
- Proposed Right-of-way
- Existing Right-of-way
- Pavement
- Park

N

0 200 400 800 Feet

Source: City of Bellevue (2004) GIS Data (Parcel), City of Redmond (2009) GIS Data (Parcel), City of Kirkland (2008) GIS Data (Parcel) King County (2008) GIS Data (Parcel,Stream, Street) King County (2007) GIS Data (Waterbody), CH2M HILL (2008) GIS Data (Park). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-19. **Acquisitions Map**

Medina to SR 202:Eastside Transit and HOV Project

Project construction will require property in addition to that acquired for right of way and permanent easements. Approximately 1.3 acres will be needed for temporary construction easements. Properties adjacent to and near construction areas, including the entire Eastside study area, could experience disturbances such as increased noise, dust, traffic, and odor due to equipment operations, and/or glare from nighttime lighting. Although the construction duration at some locations along the corridor could last for approximately 4 years, the duration of construction will vary depending on location. However, disruptions to residents and business may not occur during the entire construction duration.

Direct jobs are the number of jobs created for people working directly on a project, such as construction workers.

Indirect jobs are the number of jobs created for people working for producers of materials, equipment, and services that are used on a project, such as steel producers.

Induced jobs are the number of jobs created when people working in direct and indirect jobs associated with a project spend their increased incomes on consumer goods and services in the local and regional economy.

Project construction will result in 2,480 direct, indirect, and induced jobs during the peak year of construction (2012) and a total of 7,326 person-years of employment (one person employed for one year) over the 6 years of engineering and construction. The sum of direct, indirect, and induced effects represents the total economic effect of the project to the region. Please refer to the Land Use, Economics, and Relocation Technical Memorandum in Appendix N for additional information on the economics analysis.

How will the project affect land use, economics, and relocation during project operation?

During operation, the project will improve traffic circulation and access and reduce congestion in the study area. This will attract customers from a broader geographic area and will shorten the commute time for employees of local businesses. This will likely result in a small improvement in the economic prospects of businesses in the 520 corridor.

The additional right of way needed to construct the project from the taxable property within the jurisdictions of Medina, Hunts Point, Clyde Hill, Yarrow Point, Kirkland, and Bellevue will be removed from the local jurisdictions' tax bases, which will decrease property tax revenues. However, this will not result in a substantial effect on each jurisdiction's overall tax revenues – it will constitute less than 1 percent. The loss of

property tax revenue for the Eastside communities is estimated to be approximately $9,912.

What will happen to land use, economics, and relocations if WSDOT does not build this project?

The No Build Alternative is inconsistent with the common policies regarding urban growth and transportation system development and will not contribute to achieving regional or local goals. As a result, future development in the urban centers along the project corridor consistent with local and regional comprehensive plans could be affected, potentially increasing development pressure outside of the urban centers.

The No Build Alternative would not require acquisition of property and there would be no direct effects on land use. The No Build Alternative would not provide additional roadway capacity. In addition, without completion of the HOV system, transit service travel time and transit service reliability would not improve. Without the project noise walls, existing land uses would not experience reductions in roadway noise or changes in the appearance of the roadway.

CHAPTER 5.5 Noise

Project construction will temporarily increase noise levels in the project vicinity; however, WSDOT has incorporated measures to minimize construction noise. During project operation, the noise walls and lids that are part of the project design will substantially reduce traffic noise throughout the SR 520 corridor.

Please refer to the Noise Technical Memorandum in Appendix O for additional information about the noise analysis.

Sound is a fundamental component of daily life. When sounds are perceived as desired, beneficial, or otherwise pleasing, they are typically considered as having a positive effect on daily life. When sound is perceived as unpleasant, unwanted, or disturbingly loud, it is considered noise.

This chapter addresses noise issues in the project vicinity. WSDOT considered this project's effects on noise to help understand the potential effect of traffic and construction noise on public health and welfare.

Environmental noise may interfere with a broad range of human activities in a way that degrades public health and welfare. Examples include situations where noise adversely affects a person's hearing, mental state (for example, annoyance), or the ability to engage in important activities such as sleeping or communicating.

The project team worked with local agencies and the public to evaluate and address traffic noise, ultimately lessening noise effects from the freeway.

Why is noise considered in this EA?

Understanding the adverse effects of traffic and construction noise is an integral part of this EA. Federal, state, and local governments provide guidance on acceptable noise levels to ensure the public's health and well being, both now and in the future. Traffic and construction noise analyses are required by law for federally funded projects and by State of Washington policy for other funded projects that (1) involve construction of a new highway, (2) substantially change the horizontal or vertical alignment, or (3) increase the number of through-traffic lanes on an existing highway. State policy also requires the review and consideration of noise abatement on projects

that substantially alter the ground contours surrounding a state highway.

How did WSDOT evaluate noise levels for this project?

Typical outdoor systems used for long-term noise monitoring

WSDOT used the FHWA Traffic Noise Model Version 2.5 computer model to predict future noise levels. To validate the model, the project team measured noise levels at 43 locations in the study area between Evergreen Point Road and Bellevue Way NE. These included 4 long-term (24-hour or greater) and 39 short-term (15 to 30 minutes) monitoring locations. These measurements also help describe the existing noise levels, identify major noise sources in the study area, and characterize weekday background noise levels.

The Traffic Noise Model was used to estimate operational noise levels at 182 locations in the project corridor. Modeling was performed to determine what locations in the study area exceeded the FHWA and Washington State noise abatement criteria (NAC). Therefore, peak-hour traffic noise levels were calculated for existing conditions using current traffic volumes and for the Build Alternative and No Build Alternative using predicted 2030 traffic volumes, with and without noise mitigation measures.

What are the Noise Abatement Criteria (NAC)?

For residential and public use buildings or outdoor recreational areas, FHWA defines the NAC at 67 A-weighted decibels (dBA). WSDOT has adopted the NAC and states its own criteria at 66 dBA so that noise levels do not approach, meet, or exceed the NAC. If the NAC is approached, met, or exceeded, noise mitigation must be evaluated.

In places where noise levels were modeled as approaching, meeting, or exceeding the NAC, noise specialists evaluated whether mitigation measures could reduce traffic noise substantially enough to warrant the cost of barrier construction. This evaluation was based on WSDOT's feasibility and reasonableness criteria. See Appendix O, Noise Technical Memorandum, for additional detail about these criteria and the decision making process related to noise wall construction.

Construction noise was considered using U.S. Environmental Protection Agency (USEPA) reference levels. The analysis was based on noise levels from equipment typically used for roadway construction. Noise levels were reviewed at various distances from the proposed area of construction.

What is the study area for the noise analysis?

A detailed reconnaissance of the study area was performed to identify all noise-sensitive properties that are, or could be, directly affected by the project. All noise-sensitive properties included in this analysis are located on the north and south sides of the project corridor, as listed below.

- Medina and Hunts Point North — North of SR 520 between Evergreen Point Road and 84th Avenue NE.
- Medina and Hunts Point South — South of SR 520 between Evergreen Point Road and 84th Avenue NE.
- Hunts Point, Clyde Hill, Yarrow Point and Kirkland — North of SR 520 between 84th Avenue NE and 108th Avenue NE (east of Bellevue Way NE).
- Hunts Point, Clyde Hill, Yarrow Point and Bellevue — South of SR 520 between 84th Avenue NE and 108th Avenue NE (east of Bellevue Way NE).

East of 108th Avenue NE, the project will only restripe the highway with no change to the vertical or horizontal alignment. In accordance with Federal guidance and WSDOT noise policy, a project with two distinct parts, to be constructed in separate contracts, where one part requires a noise analysis and the other part clearly does not, may be evaluated independently for noise. Therefore, no noise analysis is required east of 108th Avenue NE.

How was the study area defined?

As defined in the WSDOT Policy and Procedures Manual and in 23 CFR 772, the study area should include all lands within 500 feet of the edge of pavement. At the request of community leaders, some study locations were farther away than the 500-foot study area required by WSDOT.

How is Sound Measured?

Sound is measured both in terms of loudness and frequency. The unit used in this EA to measure sound is called an A-weighted decibel (dBA). Sounds expressed in terms of dBA provide a single number measure of a sound's loudness based on the ear's sensitivity to different frequencies.

For a sense of perspective, normal human conversation ranges between 44 and 65 dBA. Very slight changes in noise levels, up or down, are generally not detectable by the human ear. The smallest change in noise level that a human ear can perceive is about 3 dBA, while increases of 5 dBA or more are clearly noticeable.

How noisy is the study area?

From the measurements and modeling described above, WSDOT concluded that current noise levels in the study area range between 48 and 72 A-weighted decibels (dBA). The baseline conditions in the study area include traffic on SR 520 and local arterials such as Bellevue Way NE, 84th Avenue NE, NE 28th Street, NE Points Drive, 92nd Avenue NE, and Evergreen Point Road. Under these conditions, some study area locations already approach, meet, or exceed the NAC. There are approximately 155 residences in the study area that meet or exceed the Washington state NAC of 66 dBA.

How will construction activities affect noise levels?

Several different construction stages will be required to complete the project, which will be constructed under both daytime and nighttime conditions (nighttime construction will not occur at the same location for the entire construction period). To provide the public with a general understanding of how loud construction might be, the team performed an analysis that assumed worst case noise levels based on expected construction activities. Typical construction stages and activities for the project are shown in Exhibit 5-20.

Exhibit 5-20. Noise Levels for Typical Construction Stages

Scenario	Equipment	Maximum Noise Levels (dBA)[1]
Construction preparation	Air compressors, backhoe, concrete pumps, crane, excavator, forklifts, haul trucks, loader, pumps, power plants, service trucks, tractor trailers, utility trucks, vibratory equipment	82-86
Construction of new structures and roadway paving	Air compressors, backhoe, cement mixers, concrete pumps, crane, forklifts, haul trucks, loader, pavers, pumps, power plants, service trucks, tractor trailers, utility trucks, vibratory equipment, welders	92-94
Miscellaneous activities, including striping, lighting and signs	Air compressors, backhoe, crane, forklifts, haul trucks, loader, pumps, service trucks, tractor trailers, utility trucks, welders	80
Demolition of existing structures	Air compressors, backhoe, concrete saws, crane, excavator, forklifts, haul trucks, jackhammers, loader, power plants, pneumatic tools, pumps, service trucks, utility trucks	82-92

[1] Corresponding maximum noise level as measured at 50 to 100 feet from closest receiver under normal use.

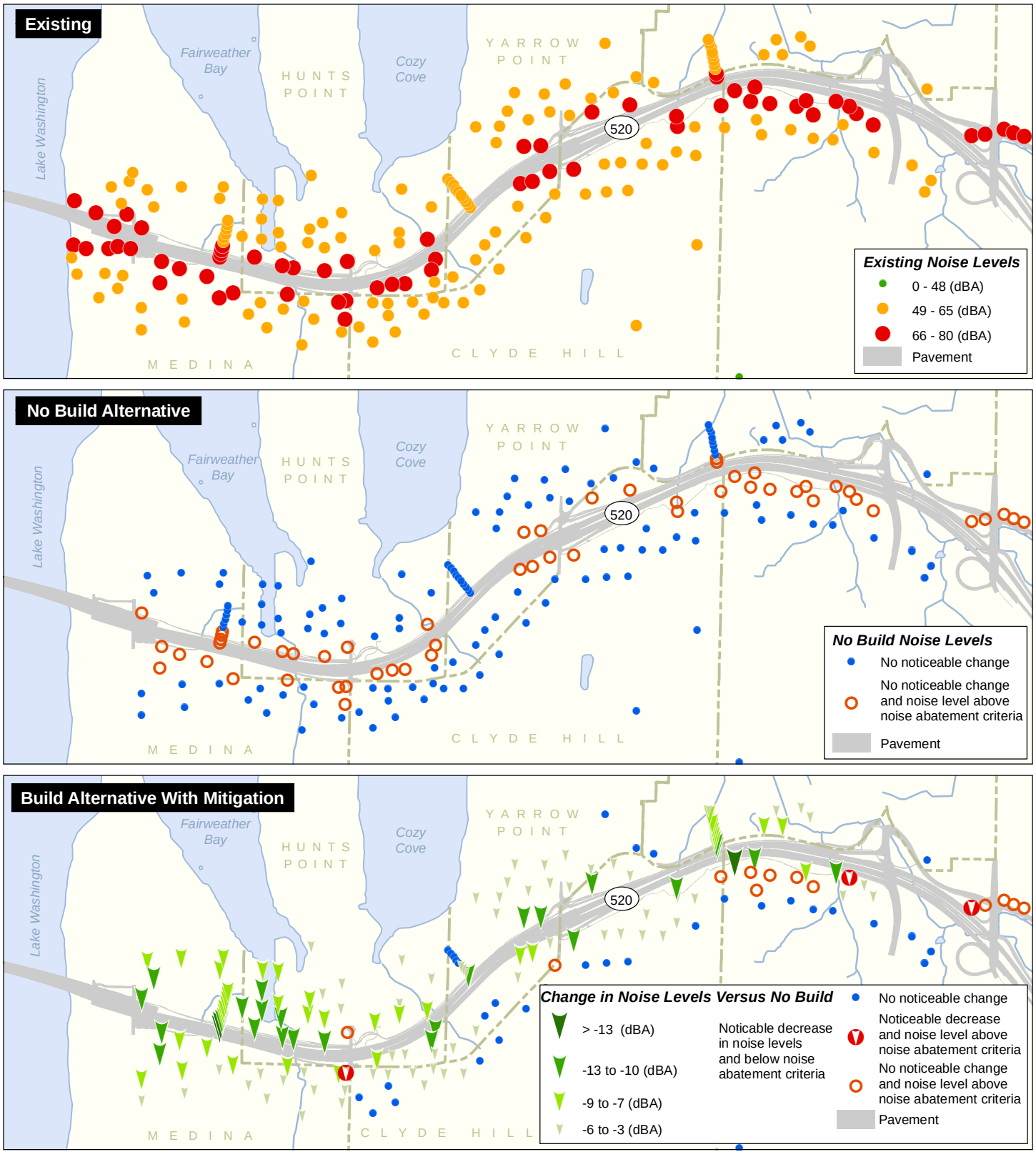
The noise levels described above will be temporary, occurring only during the construction period. Measures to minimize construction noise effects have been incorporated into the project and are described in Chapter 6.

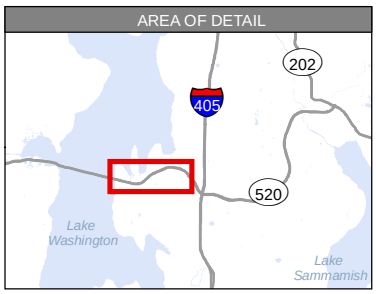
How will noise levels change after the project is completed?

WSDOT compared future traffic noise levels to the NAC to estimate traffic noise effects for the proposed project. For all locations that exceeded the FHWA criteria, the effectiveness of noise walls to reduce noise was evaluated. Exhibit 5-21 shows a comparison of existing noise levels versus noise levels for the Build Alternative and No Build Alternative.

The Build Alternative peak-hour traffic noise levels were modeled for the same 182 locations in the study area as existing peak-hour traffic conditions. Compared with today's and the projected 2030 No Build Alternative noise levels, the proposed Build Alternative, which includes noise walls and lids at the three overpasses, will reduce the noise levels substantially throughout the SR 520 project corridor. Overall, the Build Alternative will lower the number of residences where noise levels exceed the NAC from 155 today to 36. All of the remaining 36 properties exceeding the NAC do so because of noise from arterial roads, such as Bellevue Way NE, 92nd Avenue NE, and 84th Avenue NE, or because area topography limits the effectiveness of noise walls. The Build Alternative with the proposed noise walls will not cause any substantial (more than 10 dBA) increases in noise.

Noise walls are proposed for the Build Alternative from the Evergreen Point Road lid to just west of Bellevue Way NE. The noise walls will be virtually continuous through the entire area except for breaks at 84th Avenue NE and 92nd Avenue NE, where the noise walls will be integrated with the lids. The overall project corridor noise walls will be approximately 18,000 feet long with heights varying from 8 feet to 20 feet. The taller noise walls will be necessary in areas where residents are located uphill from the project corridor. For the purpose of evaluating the noise walls under WSDOT cost criteria, the proposed noise walls on the north and south side of SR 520 were considered one complete noise wall system with breaks for the 84th Avenue NE and 92nd Avenue NE lids. Exhibit 5-22 shows the locations of the proposed noise walls.





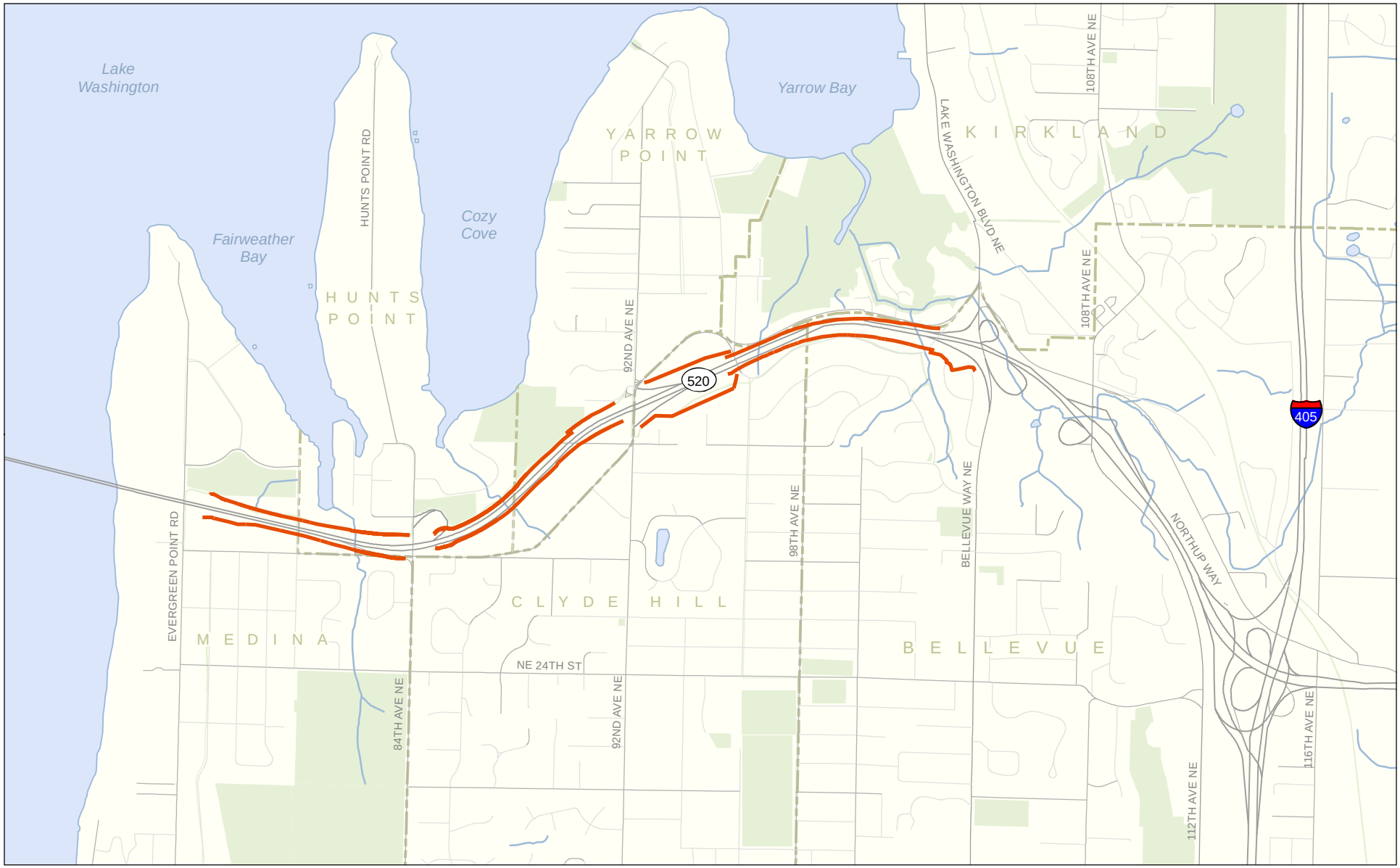
N

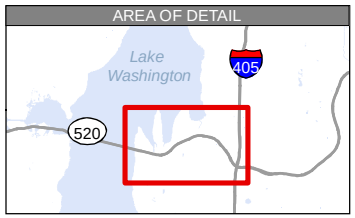
0 1,000 2,000 Feet

Source: King County (2007) GIS Data (Waterbody), City of Bellevue (1999) GIS Data (City Limits). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-21. **Noise Levels Changes in the Study Area**

Medina to SR 202: Eastside Transit and HOV Project





Proposed Noise Wall

Park

City Limits

N

0 500 1,000 2,000 Feet

Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.

Exhibit 5-22. **Noise Wall Locations**

Medina to SR 202: Eastside Transit and HOV Project

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WSDOT has developed a method of assigning a "**residential equivalents**" value to noise-sensitive areas such as parks. Residential equivalents values were calculated for the parks along SR 520, Points Loop Trail, and the SR 520 bike and pedestrian path.

A total of 437 residential equivalents (65 with noise levels of 70 dBA or higher) will benefit from construction of the proposed noise walls under the Build Alternative. Because the Build Alternative includes construction of proposed noise walls in the analysis, the number of residential equivalents experiencing traffic noise effects under this alternative will be reduced compared with existing conditions. On average, the Build Alternative will meet noise abatement objectives by providing an average of 7 to 10 dBA noise reduction. The proposed noise walls along the north and south sides of SR 520 meet the WSDOT cost criteria.

The proposed noise walls described in this EA are based on current design drawings. As the project design proceeds and is refined, it is possible that changes could occur in the vertical and horizontal alignment of the noise walls. During the design-build process, the location and height of the walls will be verified once the roadway design reaches a level where the noise walls can be finalized. During this process, it is possible that the height and placement of the walls could change. It is also possible that some walls may not be constructed as part of the project.

If a noise wall described in the EA is not constructed as part of the project, it will normally be due to one of three issues: the noise reduction of the noise wall is insufficient and does not meet WSDOT noise reduction requirements; the cost of the wall exceeds the allowable amount; or there are constructability issues such as unstable ground. Once the noise wall locations and heights are determined, WSDOT will engage residents adjacent to the proposed noise walls in an advisory community polling process to gauge support for the noise walls. In addition, alternative noise-reduction strategies may be considered along portions of the corridor where feasible.

Please refer to the Noise Technical Memorandum in Appendix O for additional information about the noise monitoring locations, walls, and analysis described in this chapter.

The Build Alternative also includes lidded highway sections that are very effective at reducing noise levels above and near the lids. The lids will be integrated with the noise walls and retaining walls. Each lid will be approximately 500 feet long, which is short enough to not require ventilation but long

enough to help reconnect the communities along SR 520. The locations of the three lids are at Evergreen Point Drive, 84th Avenue NE, and 92nd Avenue NE. Exhibit 5-23 shows an example of a depressed roadway with a lid and demonstrates how vehicle noise is contained.

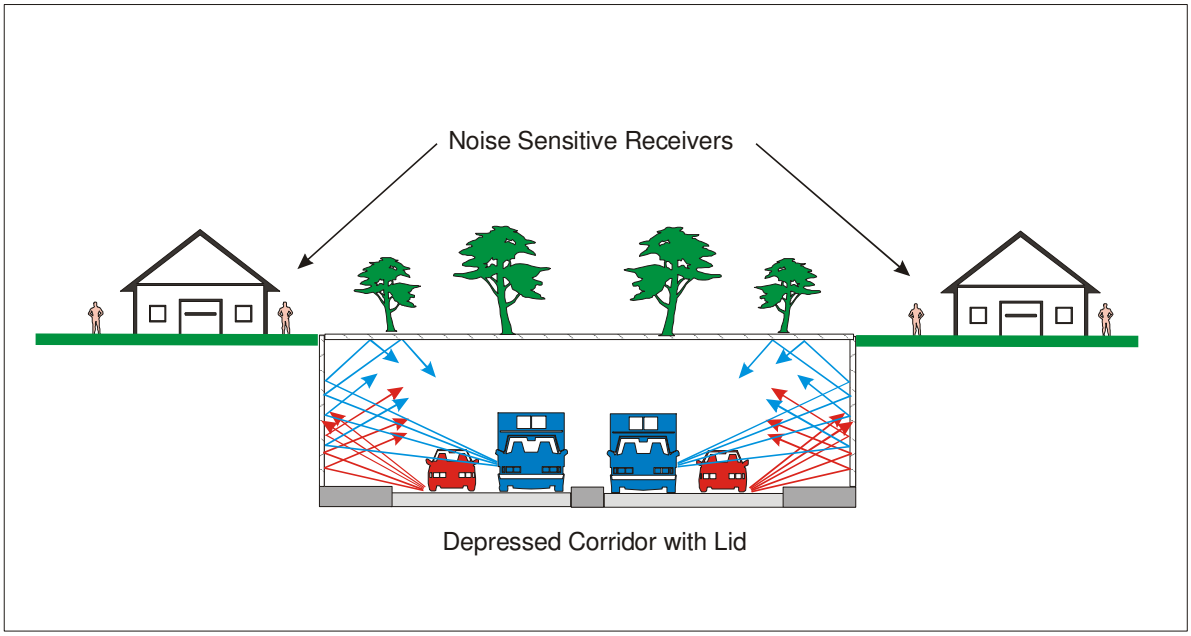


Exhibit 5-23. Example of a Depressed Roadway with a Lid

What will happen to noise levels if WSDOT does not build this project?

Under the No Build Alternative, there are approximately 173 residences in the study area where the state traffic NAC of 66 dBA would be met or exceeded. Under the No Build Alternative, noise levels are projected to increase in 2030 by only 1 to 2 dBA in most locations, an amount that is not normally noticeable to people with average hearing. However, with this increase, noise levels would exceed the NAC at an additional 18 residences, bringing the total to 173 from the current estimate of 155 residences.

CHAPTER 5.6 Social Elements

Communities in the study area could experience temporary increases in noise and dust, visual quality effects from construction activities, and glare from construction lighting. However, the project will be constructed in stages, lessening the amount of time any individual area is disturbed. The completed project will decrease traffic noise, improve emergency response times, improve traffic circulation and access, and provide improved opportunities for community interaction and recreation.

Please refer to the Social Elements Technical Memorandum in Appendix P for additional information about the social elements analysis.

Why are social elements considered in this EA?

The National Environmental Policy Act (NEPA) requires federal agencies to analyze how a transportation project could affect the surrounding communities and ensures full compliance with relevant laws and regulations. Social elements analyzed for the project include the following: community cohesion; regional and community growth; community services; recreational resources; and pedestrian, bicycle, and transit facilities.

How was information collected and what methods were used to evaluate effects?

The study area for social elements was defined as the neighborhoods adjacent to the SR 520 corridor from Lake Washington to the SR 202 interchange in Redmond. The social analysis primarily focused on neighborhoods where roadway construction will occur, from the Lake Washington shoreline to 108th Avenue NE. Information was collected from a variety of federal, state, and local sources. The following methods were used to identify and evaluate potential project effects:

- Visiting the study area to characterize the current neighborhood environment.
- Reviewing data from federal, state, county, and local agencies, including the U.S. Census Bureau, the Puget Sound Regional Council (PSRC), Washington State Office

of Financial Management (OFM), and the jurisdictions of Medina, Hunts Point, Yarrow Point, Kirkland, Bellevue, and Redmond.

- Reviewing existing documentation relevant to social conditions in the study area, including comprehensive plans and other planning documents, relevant Web sites, geographic information system (GIS) and other maps to identify community services, recreational resources, and existing and planned pedestrian, bicycle, and transit facilities in the study area.
- Creating GIS maps to identify the locations of social elements in the study area.
- Contacting staff from the parks and recreation departments in the study area, as needed, to collect additional data.
- Reviewing and analyzing discipline reports and technical memoranda prepared for the project to determine any potential effects related to social elements, including noise, air quality, hazardous materials, land use, transportation, and visual quality.
- Reviewing the public involvement plan to identify the outreach strategies used to inform the surrounding communities about the project.

What are the characteristics of the study area?

The study area north and south of SR 520 consists primarily of urban single family residential neighborhoods between Lake Washington and 108th Avenue NE where roadway construction will occur. East of 108th Avenue NE to SR 202 the project improvements would be limited to restriping of the HOV lanes, only slightly affecting those services that travel that portion of SR 520 and having no effect on adjacent neighborhoods. Construction of SR 520 in the 1960s bisected existing communities, which created a barrier to interaction between the northern and southern portions of the study area. The highway also isolated the southern portion of Hunts Point.

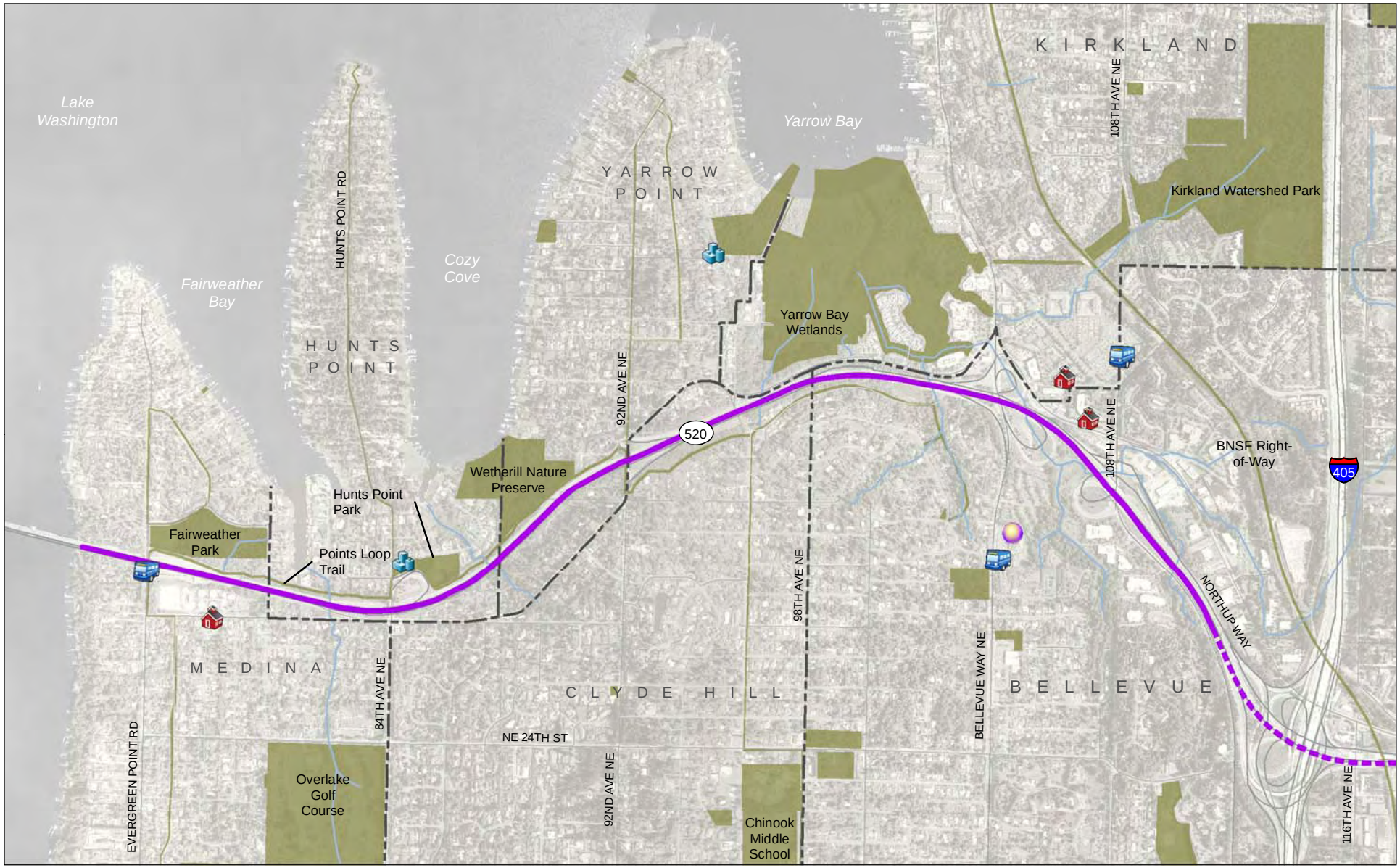
Medina, Hunts Point, Clyde Hill, and Yarrow Point offer few commercial services or any multifamily housing. Most of the houses in these areas are located on large lots that are typically treed, landscaped, and well maintained. A number of these houses are located on the shoreline of Lake Washington.

As the study area transitions to the neighborhoods of Lakeview in Kirkland and Northtown in Bellevue, land uses become more diverse, with a mixture of single family and multifamily residential and commercial and office uses.

There are relatively few places where area residents can gather to interact (for example, religious institutions and community centers); however, one of the few commercial buildings in the study area includes a coffee shop, located in Clyde Hill, that residents use as a gathering place. There are five recreational facilities in the area where residents have the opportunity to interact. Exhibit 5-24 shows the social elements in the study area.

What are the population characteristics of the study area?

The population in the study area has a higher median age and a greater percentage of the population over the age of 65 than the surrounding area. The study area also has a much higher median household income (two times that of the larger geographic area) and a relatively small percentage of the population at or below the poverty level. More of the residents are homeowners, with a low percentage of the households having no vehicle. Based on Bellevue School District Web site information, 10 percent of the students at Medina Elementary spoke a first language other than English during the 2006–2007 school year (Bellevue School District 2008a), and 27 percent of the students at Clyde Hill Elementary spoke a first language other than English during the 2008–2009 school year (Bellevue School District 2008b). At both schools, the Asian population accounted for the greatest percentage of minority students.



Source: King County (2008) GIS Data and Aerial Photo (Social Elements, Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-24. **Social Elements**

Medina to SR 202: Eastside Transit and HOV Project

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What community services are located in the study area?

Community services include schools, religious institutions, social institutions, government facilities, fire and emergency medical, police, and utilities (see Exhibit 5-24). No cemeteries or defense institutions are located in the study area.

Schools

The Bellevue School District and the Lake Washington School District serve the study area. While there are no public schools located in the study area, there are seven schools in these two districts with attendance boundaries that cross the study area. There are two private schools (Bellevue Christian School/Three Points Elementary in Medina and Eastside Preparatory School in Kirkland) and one public post-secondary school (Bellevue Community College – North Campus) in the study area (Exhibit 5-24). In addition, there are private child care facilities and preschools located in the study area.

Bellevue Christian School/Three Points Elementary in Medina

Buses for public school transportation use many of the arterials in the study area to transport students to and from school, including the roadways across SR 520 at Evergreen Point Road, 84th Avenue NE, and 92nd Avenue NE.

Religious Institutions

Only one religious institution is located in the study area. The Saint Luke's Lutheran Church is located at 3030 Bellevue Way NE (Exhibit 5-24) in the Northtown neighborhood of Bellevue. The parking lot is used as a King County Metro park-and-ride facility during weekdays.

Government Facilities

The only government facilities in the study area are two town halls: Hunts Point Town Hall, located at 3000 Hunts Point Road, and Yarrow Point Town Hall, located at 4030 95th Avenue NE (Exhibit 5-24).

Fire and Emergency Medical

The Bellevue Fire Department, Kirkland Fire Department, and Redmond Fire Department all provide service to the study area. In addition to serving Bellevue, the Bellevue Fire Department provides service to Medina, Hunts Point, Clyde Hill, and Yarrow Point. No fire stations are located in the

study area. The nearest station to the study area is Bellevue Fire Department Station #5, located at 9621 NE 24th Street in Clyde Hill. The Kirkland Fire Department Station #22, located at 6602 108th Avenue NE, and the Bellevue Fire Department Station #6, located at 1850 132nd Avenue NE, also respond to calls in the study area. The Bellevue Fire Department and Redmond Fire Department respond to calls in the eastern part of the study area where only restriping of the HOV lanes is to occur. The response time, that is, from the time a call is dispatched to the moment a fire unit arrives on the scene, averages between 5 to 6 minutes for the three fire departments. All fire departments have paramedics who provide basic life support. The Bellevue Fire Department and Redmond Fire Department are part of King County Medic One. Medic One provides advanced life support to the residents of King County.

Overlake Hospital Medical Center, located at 1035 116th Avenue NE, and Group Health Bellevue Medical Center, located at 11511 NE 10th Street, are the closest hospitals serving the study area. A Bellevue Medic One unit is based out of Overlake Hospital and responds to any calls along SR 520.

Police Departments

The police departments of Medina, Clyde Hill, Kirkland, Bellevue, and Redmond serve and protect the residents in the study area. The Medina Police Department provides service to the residents of Hunts Point, and the Clyde Hill Police Department provides service to the residents of Yarrow Point. There are no stations in the study area. In addition to these police departments, the Washington State Patrol (WSP) serves the study area. The WSP patrols and investigates all collisions within the study area along SR 520, I-405, and SR 202.

Because the majority of the study area consists primarily of single family residences with relatively small population bases, there are few community services. The neighborhoods in the study area also include a variety of pedestrian, bicycle, and transit facilities.

What recreational facilities are located in the study area?

Five recreational facilities were identified in the study area: Points Loop Trail, Fairweather Park, Hunts Point Park, Wetherill Nature Preserve, and the Yarrow Bay wetlands.

Points Loop Trail connects Medina and Hunts Point.

Points Loop Trail is a 5.4-mile-long trail that links the communities of Medina, Hunts Point, Clyde Hill, and Yarrow Bay. It includes 1.6 miles of off-street trails, 2.4 miles of streets with sidewalks, and 1.4 miles of trail along residential streets. Where it parallels SR 520, the trail passes along the south side of Fairweather Park, Hunts Point Park, and Wetherill Nature Preserve, and is located completely within the WSDOT right of way.

Fairweather Park is a public park in Medina consisting of 11 acres of forested open space. The terrain ranges from upland forest to wetland, and is bisected by a spring-fed stream. Tennis courts and a small grassy playfield are located in the western area of the park.

Fairweather Park

Hunts Point Park, also known as D.K. McDonald Park, encompasses roughly 2.5 acres in the south part of the Town of Hunts Point. Park amenities include tennis courts, a children's play area, an open sports area, and benches. The parkland was originally acquired from the Bellevue School District and named after long-time resident D. K. McDonald, who purchased enough bonds to finance construction of the park. The park also contains the Town Hall.

Wetherill Nature Preserve

The 16-acre Wetherill Nature Preserve was donated to the towns of Hunts Point and Yarrow Point in 1988 with the requirement that the towns protect the land in perpetuity from development and preserve its native wildlife and plants. A number of pedestrian-only trails wind through the park and provide waterfront views. The parkland is privately maintained through volunteer efforts and contributions. The Points Loop Trail is located immediately adjacent to the south side of the park within the WSDOT right of way and connects to pedestrian paths within the preserve.

Yarrow Bay wetlands is a 73-acre wildlife conservancy area that can be explored either by nonmotorized craft, such as canoes and kayaks, or by following one of two trails that border the park.

These parks and recreation facilities are important resources that are highly valued by local governments and community members.

How will project construction affect social elements?

Effects during construction are considered short-term when compared with the operational life span of the proposed project. While the duration of construction activities associated with the project may seem long for affected residents, most of the construction activities will occur within existing WSDOT right of way, minimizing the extent of the construction effects on the surrounding area. Construction is expected to last for approximately 4 years (2010 to 2014), and the project will be constructed in stages, which will lessen the amount of time any individual area will be disturbed.

Typical construction activities will result in increases in noise and dust levels, which will detract from visual quality due to staging of construction equipment, and create glare from lighting during any required nighttime construction. Construction noise will be short-term and generally occur during the day. The noise levels will depend on the type, amount, and location of activities. WSDOT will comply with all local and/or county noise restrictions or apply for variances with the appropriate jurisdictions.

How will project operation affect social elements?

Many of the effects of project operation on the social elements will be positive. The project will have the following effects on social elements:

- The construction of lids over SR 520 will reconnect neighborhoods in Medina, Hunts Point, and Yarrow Point that were bisected in the 1960s with the original construction of SR 520. These lids will include landscaped

open space areas, providing opportunities for area residents to interact with one another.

- Noise walls will lower noise levels below the noise abatement criteria (NAC) for many residences in the study area. In those locations where noise walls are not reasonable or feasible, noise levels will be similar to existing conditions.
- The project will improve response and travel times for fire, emergency medical, police, and other public service providers in the study area.
- The project will provide a continuous bicycle and pedestrian path, a new linkage in the regional bike/pedestrian path.
- The transit improvements associated with the project (eastbound HOV, continuous HOV lanes, inside transit stops, and direct access ramps from SR 520 connecting to the South Kirkland Park-and-Ride) will improve transit travel times, access, and safety. These benefits will also accrue to carpools and vanpools.
- The project will not displace affordable housing or community services, nor will it create any physical impediments that make it more difficult for residents to access community services or affordable housing.
- The project will not change the delivery of public services within the study area or create the need for additional public services.

Potential effects of the project related to air quality, hazardous materials, land use, noise, transportation, and visual quality are discussed elsewhere in this EA.

What will happen to social elements if WSDOT does not build this project?

Under the No Build Alternative, there would be no construction-related effects on any of the social elements in the study area because no action would be undertaken. The residents in the study area would not be adversely affected by noise, dust, or increased traffic congestion.

Under the No Build Alternative, none of the improvements would be constructed. There would be no reconnection of areas originally bisected by the construction of SR 520 in the 1960s; no improvements in transit and HOV travel times; no reduction in noise levels for many of the residences adjacent to the SR 520 corridor; and no improvements to pedestrian and bicycle facilities. The No Build Alternative would not require the acquisition of any properties, minimizing any effects on these properties.

CHAPTER 5.7 Transportation

The project will improve HOV access between the local street system and SR 520, improve the reliability of HOV travel times, and provide the infrastructure and operational improvements needed to support anticipated growth in transit services in the study area. The project also includes new facilities for improving bicycle and pedestrian connections and enhancing nonmotorized travel. Project construction will result in temporary effects to travel along the SR 520 corridor; these effects might include reduced speed limits, reduced lanes on arterial streets, and limited freeway access from some arterials.

Please refer to the Transportation Discipline Report in Appendix Q for additional information about the transportation analysis.

This chapter describes the key findings from the analysis of transportation effects related to the project, and discusses freeway and local traffic volumes and operations, nonmotorized facilities, transit operations, parking supply, freight, and safety, with and without the project.

Why is transportation considered in this EA?

Understanding the effects of a proposed public transportation project and its alternatives on the transportation system is an important part of any environmental assessment and is required by law. The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision-making processes. Federal, state, and local agencies must consider the environmental effects of their proposed actions and reasonable alternatives to those actions.

How did WSDOT evaluate traffic and transportation data for this project?

The project team used a travel demand model to forecast freeway traffic volumes for the Build Alternative and No Build Alternative to assess potential project effects on roadway operations throughout the study area. The team also studied traffic volumes on local streets around SR 520 to determine current traffic conditions at four interchanges: 84th Avenue

NE, 92nd Avenue NE, Bellevue Way NE, and 108th Avenue NE. This information provided the basis for forecasting transportation conditions on SR 520 and adjacent local streets under the Build Alternative and No Build Alternative.

What are the key assumptions used in the traffic analysis?

The I-5 to Medina: Bridge Replacement and HOV Project, and tolling of SR 520, were not included as background assumptions for traffic modeling purposes.

The forecasts and traffic analysis included the effects of other regional projects that were known to be planned and funded at the time analysis commenced. For information about other planned projects that are assumed to be part of the SR 520 transportation network, please refer to the Transportation Discipline Report in Appendix Q.

To determine the effects of the Build Alternative, the project team compared it to the No Build Alternative. This comparison allows analysts to determine the difference in future traffic operations if the project is built or is not built. In addition to the traffic analysis, the team evaluated the project's direct effects upon nonmotorized travel, transit, and parking. The team also analyzed the project's construction and cumulative effects.

What is traffic like now along SR 520 and what will it be like in the future?

Under existing conditions, an average of 115,000 vehicles pass through the study area each day. The existing configuration of SR 520 does not meet current WSDOT design guidelines and reduces the freeway's capacity to provide reliable and safe travel for buses and carpools (HOV) and general-purpose traffic. These conditions result in congestion due to traffic demand that exceeds the capacity of the corridor. The congestion reduces both general-purpose (GP) and high-occupancy vehicle (HOV) trip reliability. Sections of SR 520 are typically congested at the following locations:

- In Medina, beginning where the HOV lane terminates east of the SR 520 bridge, during the westbound morning and evening commutes.
- Between 124th Avenue NE and I-405 during the westbound evening commute.
- Beginning at the SR 520 terminus at Avondale Road during the eastbound evening commute.

Between today and 2030, it is estimated that the region's population will grow by 1.1 million people, add over 850,000 new jobs, and need to accommodate close to 50 percent more traffic on major transportation facilities. Exhibit 5-25 shows the forecasted changes in people (represented by daily vehicle demand volumes) traveling on SR 522, SR 520, and I-90 for the Build Alternative and No Build Alternative.

For the Build Alternative, volumes on SR 520 (135,000 vehicles) will be similar to the No Build Alternative (132,900 vehicles). The project will not substantially affect demand volumes for people traveling on SR 520, I-90, or SR 522 because it will not add any general-purpose capacity. While more people will want to use the roadways in 2030 (represented by demand volumes), congestion will limit how much traffic can actually pass through the corridor (described as throughput) during peak hours. Year 2030 peak-hour traffic will not be substantially different than it is today. Overall, a growth in HOV travel (carpools and buses) during the morning and afternoon peak-hour commute can be expected because a higher percentage of people (66,400) will use SR 520 than vehicles (58,600).

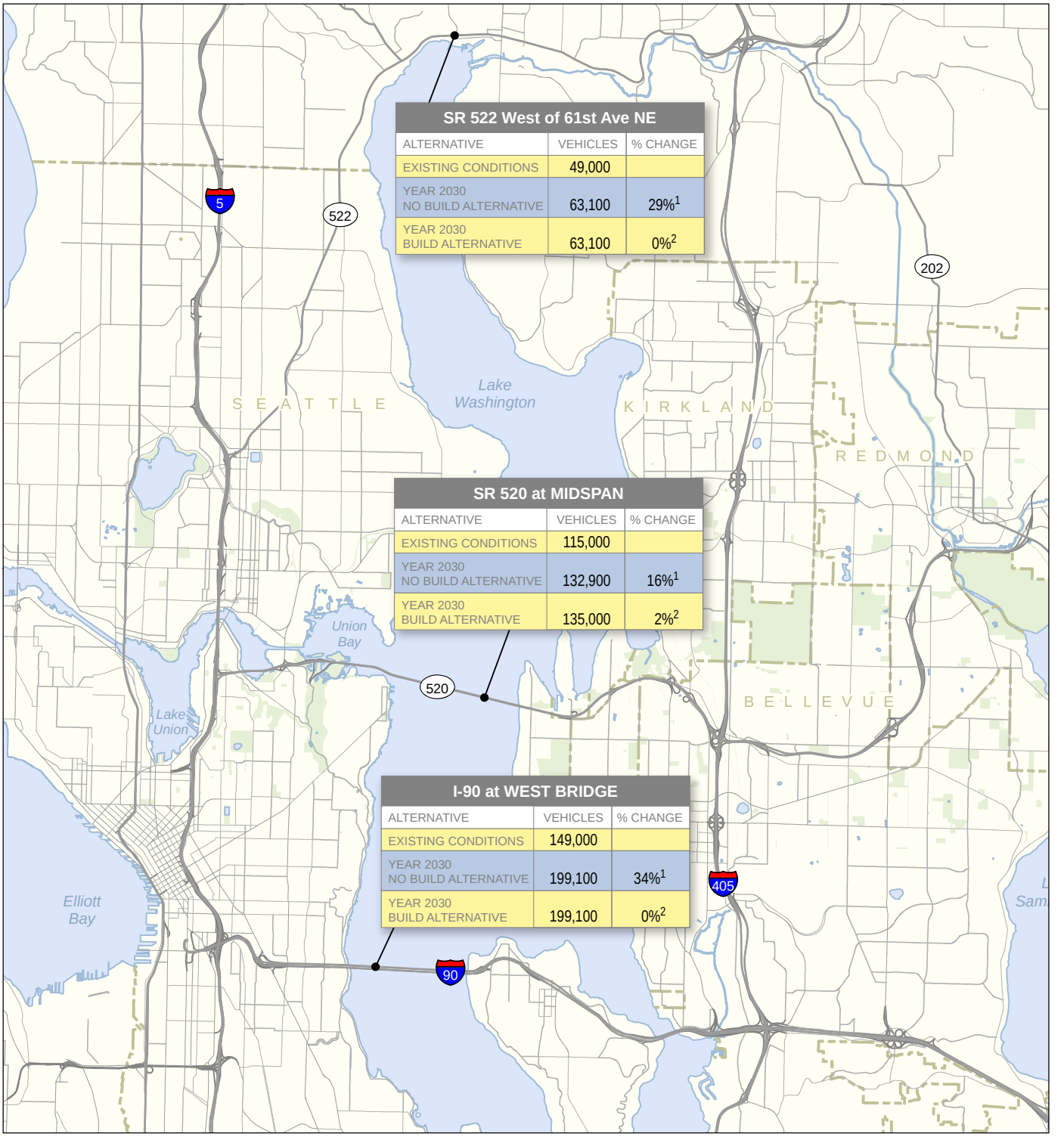
Throughput is the number of vehicles being carried on a facility. This is usually measured at a specific point on the roadway facility for a predetermined period of time (WSDOT 2008b).

How will the completed project affect traffic on SR 520?

The Build Alternative will improve many of today's substandard conditions along the SR 520 corridor and relocate the HOV traffic to the inside lanes of the corridor. These improvements will have substantial travel time, reliability, and safety benefits—especially for buses and carpools.

The project will result in the following beneficial effects to the SR 520 corridor in 2030:

- Improved travel time reliability for buses and carpools between I-5 and SR 202, particularly during the afternoon commute. Up to 5,500 carpool and bus users per hour during the afternoon commute will benefit from this improvement and bypass general-purpose lane congestion.



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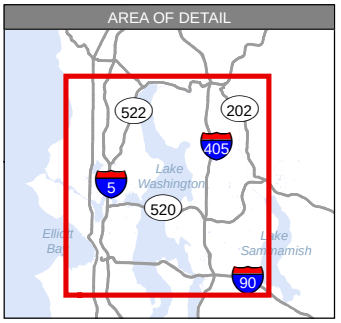

[1]Compared to Existing Conditions
[2]Compared to Year 2030 No Build Alternative

Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

N

0 1 2 Miles

Exhibit 5-25. **Daily Vehicle Demand Volumes on SR 522, SR 520, and I-90**

Medina to SR 202: Eastside Transit and HOV Project

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- In the afternoon commute, westbound HOV travel times will improve between 18 and 45 minutes over the No Build Alternative and be 29 to 44 minutes faster than general-purpose travel times. Eastbound HOV travel times will improve between 5 and 16 minutes over the No Build Alternative and be 5 to 8 minutes faster than general-purpose travel times.
- Safety will be improved due to wider shoulders and the HOV lane at the inside of the corridor, which reduces higher-speed HOV/general-purpose conflict points.
- Freeway mainline operations at merge points with ramps, transit stations, and HOV lane terminations will improve due to deceleration and acceleration lane improvements, including the addition of auxiliary lanes between ramps. Capacity, speeds, and safety will be improved as a result.
- With improved merge points, more traffic will be served on the on-ramps at the 84th, 92nd, and Bellevue Way NE/108th Avenue NE interchanges. This will reduce congestion on the local streets.
- HOV traffic to and from the west will have a more direct transit and HOV connection between SR 520 and the South Kirkland Park-and-Ride lot. This connection will improve transit travel times and reliability.

How will the completed project affect local arterials and streets, interchange areas, and HOV access?

The project will alleviate some of the freeway-related congestion on local streets and improve transit and HOV access to SR 520 from local streets. However, intersection level of service (LOS) will be the same with or without the project. Although there will still be congestion with the Build Alternative, it will not last as long as that for the No Build Alternative.

Overall, the project will improve mobility for people traveling in the SR 520 corridor. Morning and afternoon peak-hour traffic volumes on local streets will be slightly higher with the Build Alternative (approximately 5 percent). SR 520 project improvements will change freeway access by shifting traffic

Level of service (LOS) is a measure of how well a freeway or local signalized intersection operates. For freeways, LOS is a measure of traffic congestion typically based on volume-to-capacity ratios. For local intersections, LOS is based on how long it takes a typical vehicle to clear the intersection. Other criteria also may be used to gauge the operating performance of transit, non-motorized, and other transportation modes.

patterns, thereby increasing traffic volumes on some local streets. The greatest increase will be 150 vehicles per hour (vehicles per hour) on Northup Way.

More specifically, it is anticipated that the project will result in the following beneficial effects to local arterials and streets:

- At 84th Avenue NE, freeway mainline improvements will allow the on-ramp to serve more vehicles (50 vehicles per hour) while maintaining SR 520 mainline operations. There will be less congestion on the on-ramp and, therefore, less congestion on 84th Avenue NE and NE 8th Street during the afternoon peak-hour.
- At 92nd Avenue NE, traffic circulation will be improved with a new roundabout at the intersection of the westbound SR 520 off-ramp and a new drop-off and pick-up area on the interchange lid.
- At Bellevue Way NE, a new ramp reconfiguration will eliminate the weave condition between the loop ramps on northbound Bellevue Way NE, reducing congestion during the afternoon commute.
- At 108th Avenue NE, the existing SR 520 westbound off-ramp to this avenue will be reconstructed to the south to create a new intersection with the HOV direct access ramps. The effects of this change on local traffic are as follows:
    - Improved operations for both SR 520 westbound off-ramp and 108th Avenue NE northbound traffic because of the increased distance between the westbound off-ramp and the Northup Way/108th Avenue NE intersections.
    - Northbound traffic on 108th Avenue NE will travel to Bellevue Way NE for access, instead of turning left onto the SR 520 westbound on-ramp.

How will the completed project affect transit operations?

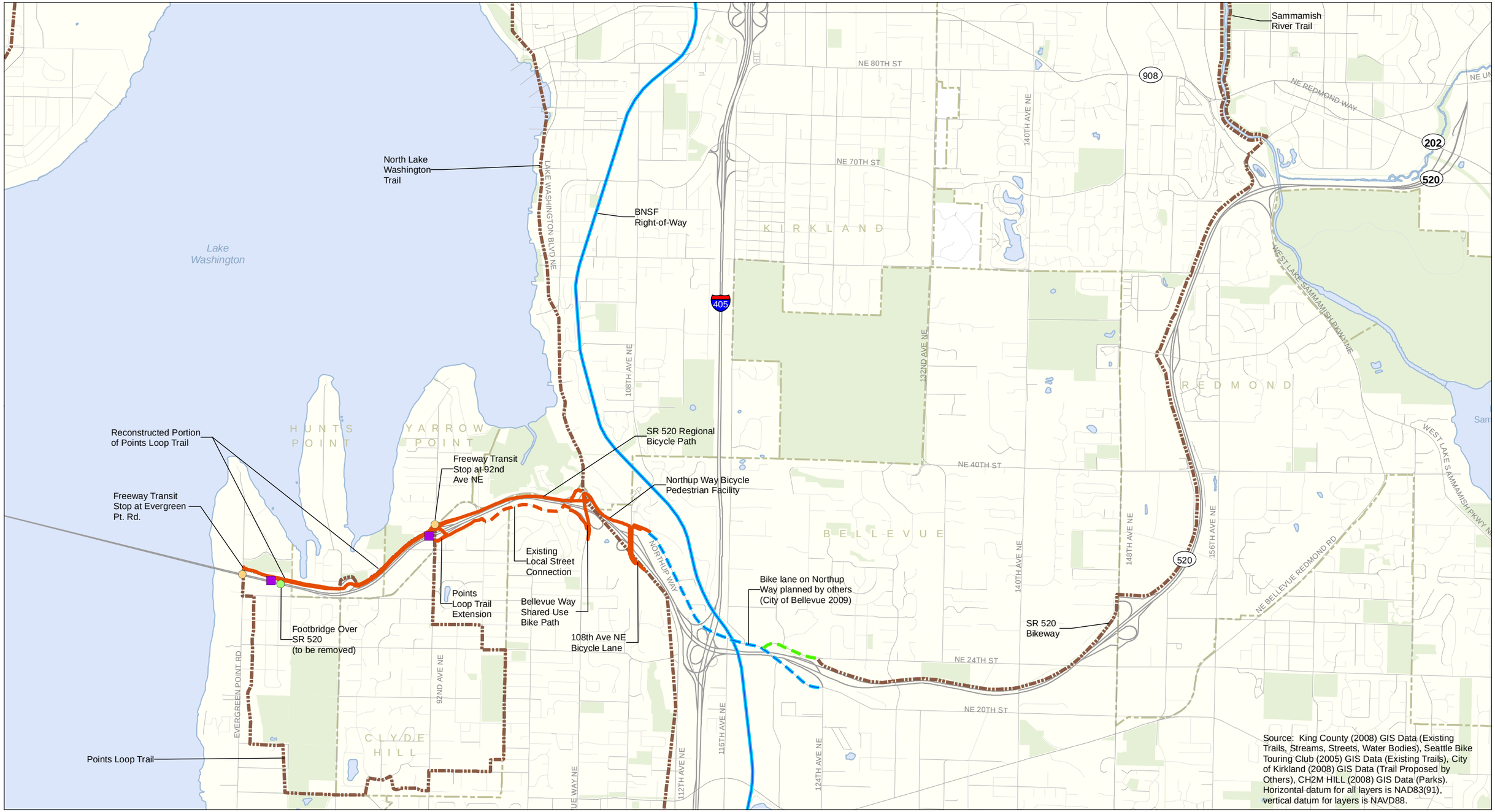
Relocating the HOV lane to the inside of the SR 520 corridor between Medina and SR 202 will allow carpools and buses to reliably bypass congestion. HOV lane operations and safety will also improve as general-purpose drivers no longer need

to merge across the lane to access ramps. The project will have the following beneficial effects on transit operations:

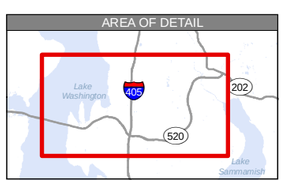
- Travel time savings will be the greatest for westbound buses and carpools during the afternoon peak period, which is when the westbound general-purpose lanes will be congested as far east as the NE 40th/51st Street interchange in Redmond.
- HOV travel times between I-5 and SR 202 are expected to reliably average 20 minutes westbound and 15 minutes eastbound. This is a 20- to 50-minute improvement for westbound traffic and a 5- to 15-minute improvement eastbound (compared with the No Build Alternative).
- Westbound HOV travel will be 30 to 45 minutes faster than general-purpose travel. Eastbound HOV travel will be 5 to 10 minutes faster. This travel time benefit, along with the reliability improvements, will increase the attractiveness of transit as an alternative to driving alone.
- With the movement of the HOV lane to the inside of SR 520, the addition of an HOV direct access ramp at 108th Avenue NE will improve access between SR 520 and the South Kirkland Park-and-Ride, especially for eastbound buses.
- The 92nd Avenue NE and Evergreen Point freeway transit stations will be moved to the inside with improved deceleration and acceleration lanes , enhancing transit operations and safety.
- Transit station design and access will be incorporated into the interchange lids, making the stations integral parts of the local communities served. The transit station design features will improve the waiting experience for transit users and be Americans with Disabilities Act (ADA) compliant.

How will the completed project affect nonmotorized facilities?

The project's nonmotorized improvements will substantially enhance both the commuting and recreational opportunities in the SR 520 corridor. Exhibit 5-26 shows existing and proposed nonmotorized facilities.



AREA OF DETAIL



- Existing Footbridge
- Transit Stop
- Project Proposed Transit Stop
- Project Proposed Trail
- Existing Trail
- Trail Proposed by Others
- Bike Lane Proposed by Others
- Off-street Path Proposed by Others

N

0 1,000 2,000 4,000 Feet

Note: Existing and proposed sidewalks not shown.

Exhibit 5-26. **Existing and Proposed Nonmotorized Facilities**

Medina to SR 202: Eastside Transit and HOV Project

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The project will be consistent with regional planning efforts. Design of the nonmotorized facilities will retain flexibility for future roadway and nonmotorized facility design in the region and will facilitate future connections to regional and local trail systems.

More specifically, the project will have the following beneficial effects on nonmotorized facilities:

- Approximately 2 miles of paved trail will be added for the exclusive use bicycles, pedestrians, and other nonmotorized means of travel between Bellevue Way NE and Evergreen Point Road.
- The SR 520 regional path will provide a more direct, ADA-compliant commuting option compared with the No Build Alternative.
- The Points Loop Trail will be reconstructed between Evergreen Point Road and 92nd Avenue NE, improving conditions through the interchanges with lids and tunnels.
- The interchange lids will provide green space, allow access to the SR 520 median transit stations, and enhance community connectivity.
- The SR 520 regional path and the Points Loop Trail will improve cross-corridor routes and connections between neighborhoods. They will also provide direct connections for pedestrians and cyclists to access transit facilities.

What is the SR 520 regional path?

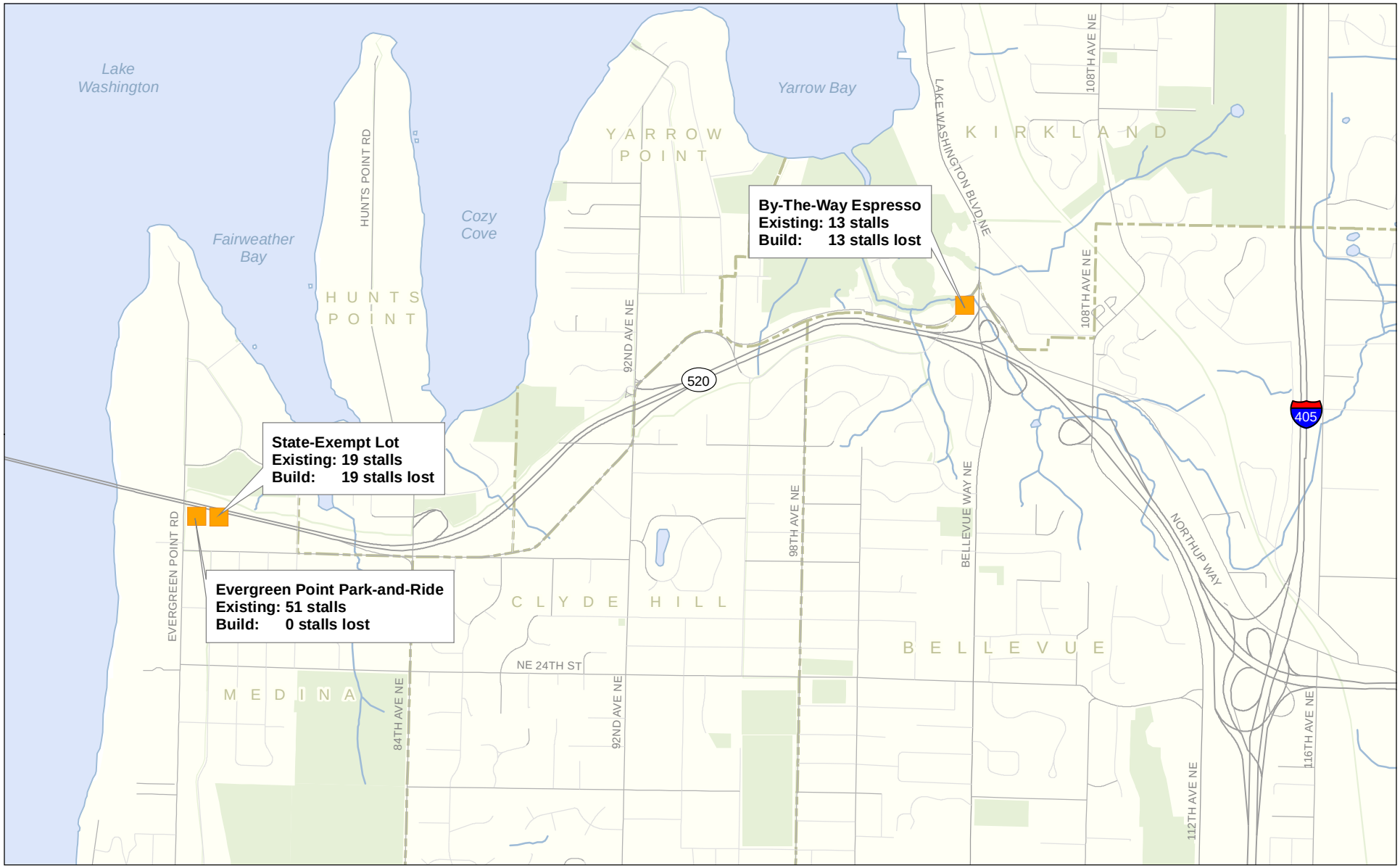
The SR 520 regional bicycle path will be a 14-foot-wide, Class I, paved regional trail. The path will originate from an at-grade connection with Evergreen Point Road (which will also connect to the existing Points Loop Trail at this location) and extend east to South Bellevue Way. The path will cross 84th Avenue NE at-grade. At both South Bellevue Way and 92nd Avenue NE, switchbacks onto the elevated crossings will be constructed to access the local streets. Undercrossings will be provided at South Bellevue Way and 92nd Avenue NE for the nonmotorized traffic continuing east.

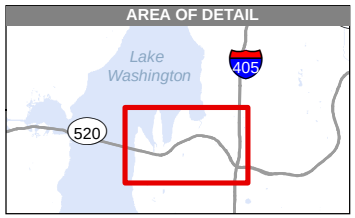
How will the completed project affect parking?

Exhibit 5-27 shows the potentially affected parking areas. The project will result in a loss of 32 parking spaces from two locations:

- The entire 19-space WSDOT-owned lot in Medina will be eliminated. This lot is available only to official WSDOT vehicles and is minimally used.
- The 13-space parking lot adjacent to the By the Way Espresso Stand in Kirkland has been purchased. This parking lot was minimally used and will not be replaced.

  An additional 10-15 parking stalls will be added at the Evergreen Point Road Park and Ride lot.





Parking Area
Park
City Limits

N

0 500 1,000 2,000 Feet

Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.

Exhibit 5-27. **Potentially Affected Parking Areas**

Medina to SR 202: Eastside Transit and HOV Project

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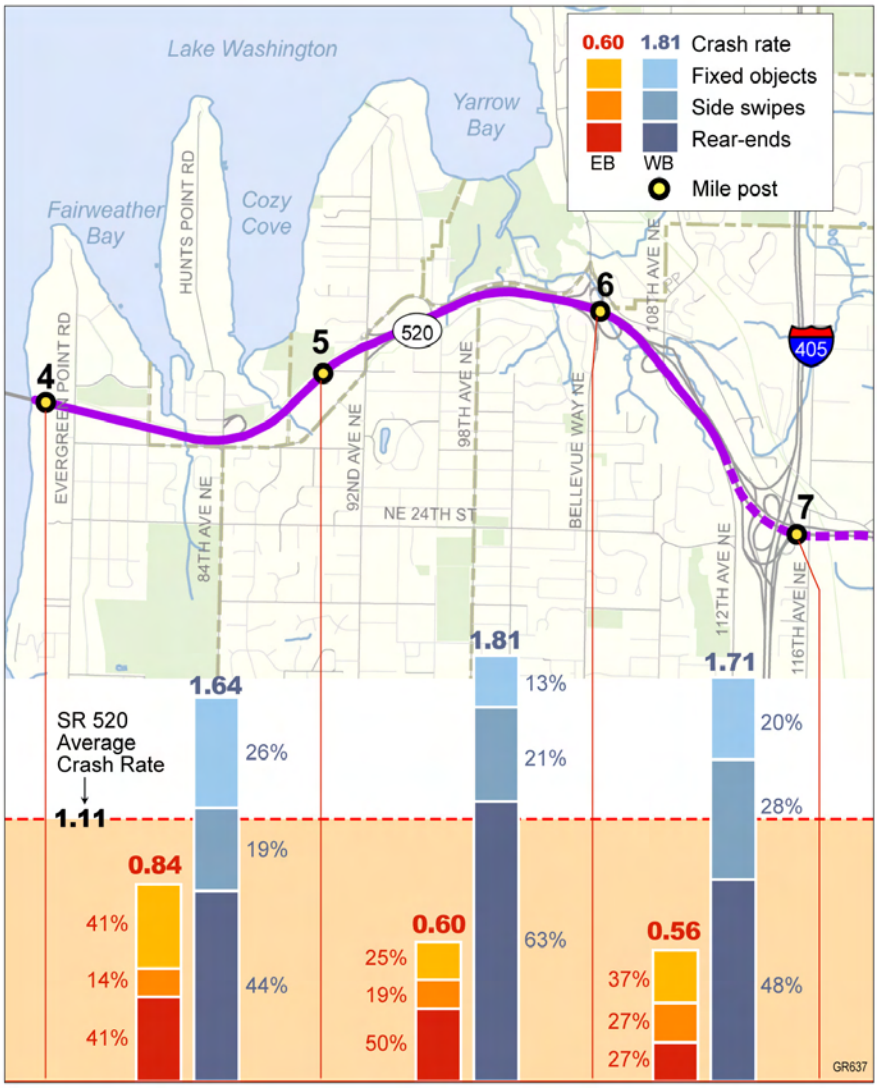
How will the completed project affect safety?

The existing configuration of SR 520 does not meet current WSDOT design guidelines and reduces the freeway's capacity to provide reliable and safe travel for buses and carpools (HOV) and general-purpose traffic. For example, congestion, and the weaving activity between the ramps and outside HOV lanes, contributes to an accident rate up to 1.81 accidents per million vehicle miles traveled for westbound traffic between I-405 and Medina. This rate is notably higher than the average accident rate for the entire SR 520 corridor (1.11). Exhibit 5-28 shows east and westbound collision rates along the SR 520 mainline between Medina and I-405.

Under the Build Alternative, the project will improve roadway safety with wider shoulders, longer merge distances, and inside HOV lanes. The project will also improve ramps in the SR 520 project area, bringing the design up to current design guidelines and helping to alleviate current safety issues along the SR 520 mainline and ramps. The proposed design will allow smoother transitions for vehicles to change lanes, merge onto, and exit from the freeway.

Adding a direct access HOV lane from 108th Avenue NE will reduce potential conflicts at this interchange because HOV traffic will no longer need to make multiple lane changes to exit and access the HOV lane.



Source: SR 520 Crash Data (January 2006 through December 2008) (WSDOT 2009c)
Note: All crash rates are listed in crashes/mvmt.

Exhibit 5-28. Collision Safety Data

How will travel be affected during construction?

Construction will take approximately 4 years and include approximately 5 stages. The potential influence the project may have over traffic patterns, interchanges, transit stations, nonmotorized facilities, and other corridor elements is described below.

General

- SR 520 will remain open between 5:00 am and 9:00 pm on weekdays throughout construction and operate with all lanes, including the westbound HOV lane.
- Construction effects to SR 520 traffic during the weekday morning and afternoon commute times will be minimal.
- Multiple full-weekend closures are expected; however, closure hours and dates will be restricted to avoid special events and other freeway closures that might occur. The primary detour route for an SR 520 closure is the I-90 bridge. However, traffic conditions on I-5, I-405, and SR 522, as well as primary arterials surrounding Lake Washington, will also be affected.
- Nighttime lane and ramp closures will occur outside of peak commute hours.

Lid and Interchange Activities

- Traffic on the Evergreen Point Road NE, 84th Avenue NE, and 92nd Avenue NE overpasses will be maintained at all times during construction of the proposed lids because there are no alternative detour routes on the north side of the freeway.
- The Bellevue Way NE overpass will also remain open throughout construction; however, there may be stages where the roadway is reduced from five to three lanes (approximately 10 months) and four lanes (approximately 1 year).

  The southbound Bellevue Way NE to westbound on-ramp may be closed for 2 to 3 months and the 108th Avenue NE westbound on-ramp for 6 to 9 months during construction.

  Construction restrictions will be in place to prevent closures of both ramps at the same time. A detour route between the two ramps via Northup Way will be in place during the ramp closures.
- Sidewalks along all arterials will be maintained during construction.

Freeway Transit Stations

- The Evergreen Point Road and 92nd Avenue NE freeway transit stations may need to be closed for short durations (4 to 6 months). Construction restrictions will be in place to prevent closure of both stations at the same time. However, the park and ride lot at Evergreen Point Road may be closed for up to two years during construction of the lid. WSDOT will work with local transit agencies to provide advance notice and alternatives for the users of the facility.
- The freeway transit stations will remain on the outside shoulders of SR 520 during Stages 1 through 4 of construction and will not shift to the inside of the freeway until Stage 5, when all supporting infrastructure is in place. This staging will minimize disruption to current commuters and ensure that full and safe access is available to the new facilities.

Truck Traffic

- Construction on surface streets and the lid structures will require truck traffic on arterial roadways because the work site will not be accessible from the freeway; however, trucks are not expected to measurably affect traffic on arterial streets due to the anticipated low rate of occurrence (one truck every 5 minutes).

Nonmotorized Facilities

Several nonmotorized facilities will be affected on a short-term basis during construction, including the following:

- Points Loop Trail – Evergreen Point Road to 92nd Avenue NE on the north side of SR 520.
- Points Drive NE (which is commonly used by bicyclists) – 92nd Avenue NE to Bellevue Way NE on the north side of SR 520.
- Freeway Crossings – Evergreen Point Road bridge sidewalk, pedestrian bridge (near 79th Avenue), 84th Avenue NE bridge sidewalk, 92nd Avenue NE bridge sidewalk, Bellevue Way NE bridge sidewalk, and 108th Avenue NE sidewalk.
- Freeway Transit Stations – Evergreen Point Road and 92nd Avenue NE stations.

With the exception of the pedestrian bridge, construction restrictions will be in place to prevent any long-term closures of these facilities. The pedestrian bridge will be permanently demolished as part of this project. Pedestrians currently using this bridge will need to use an alternative crossing, such as Evergreen Point Road or 84th Avenue NE. In the event that a short-term closure at either of these crossings is required, a temporary ADA-compliant detour route around the construction activity will be provided so that the effects on these facilities and their users will be minimal.

CHAPTER 5.8 Visual Quality and Aesthetics

Temporary project activities will result in noticeable changes to visual quality wherever demolition and construction occur. Operation of the project could affect structures, vegetation, and views and create new sources of shadow, glare, or light. As part of the project design, WSDOT has incorporated measures to minimize the project's effects on visual quality, and will adhere to all applicable aesthetic design guidelines and visual quality standards. Although the completed highway will look different than it does today, that look is intended to fit the character of the area as the highway serves the transportation needs of the community.

Please refer to the Visual Quality and Aesthetics Technical Memorandum in Appendix R for additional information about the visual quality and aesthetics analyses.

Why are visual quality and aesthetics considered in this EA?

Construction or modification of highways, which are publicly owned, can considerably affect the quality and character of the landscape (FHWA 1989). Understanding the effects of a proposed project and its alternatives on the visual quality of the landscape is an integral part of any environmental assessment and is required by law. The project team used FHWA's visual quality assessment method (FHWA 1989) to ensure that potential changes to visual quality and aesthetics resulting from the project are adequately and objectively considered.

How did WSDOT identify and evaluate visual quality and aesthetics?

The project team visited the entire proposed project corridor several times to develop qualitative assessments and descriptions of existing landscape conditions. They reviewed community planning documents and U.S. Geological Survey and geographic information system (GIS) maps to identify existing or possible future conditions. The team also identified views or routes that are designated by code or in planning documents as requiring special consideration because of their scenic value.

The team evaluated the project engineering plans and documents and compared them to existing conditions and planning documents. They also reviewed relevant information from other reports for this EA.

The team used a visual quality assessment matrix, a tool developed by WSDOT, to provide another means of evaluating visual quality. This matrix lists the numeric rankings assigned to visual quality parameters and components for selected views throughout the study area.

What is the study area for the visual quality and aesthetics analyses?

A **viewshed** is the area that can be seen from a given viewpoint or group of viewpoints; it is also that area from which that viewpoint or group of viewpoints can be seen.

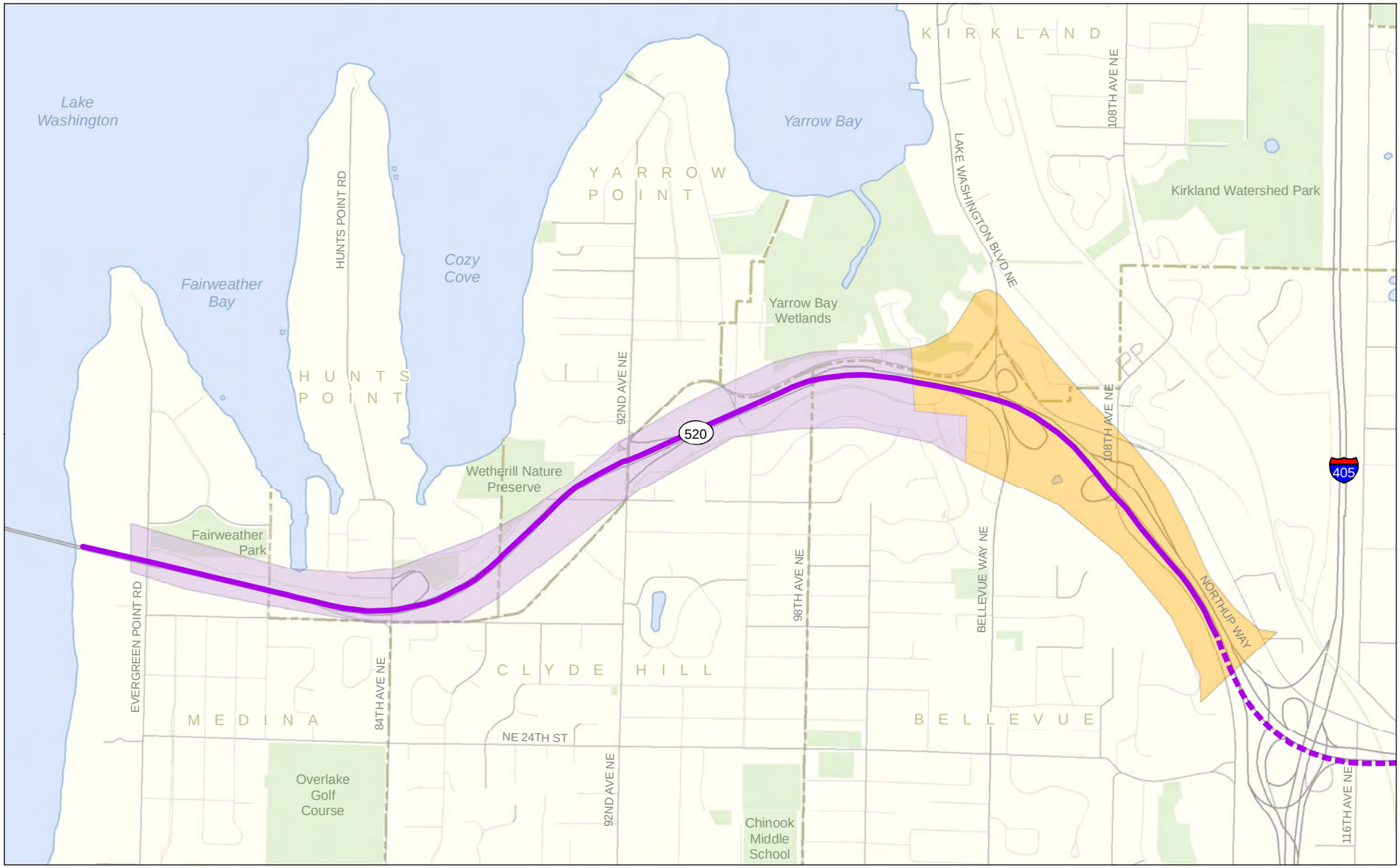
The area studied in this visual quality assessment is called the project viewshed. For this project, the viewshed is the aggregate area that has views of or from SR 520.

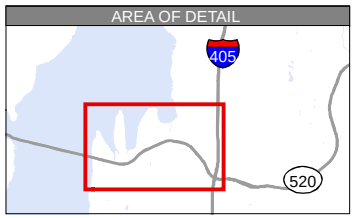
The Eastside viewshed is defined primarily by its rolling terrain. The viewshed is further defined by the masses of tall trees and dense shrubs that line the highway. The Eastside viewshed is somewhat larger than the project area because SR 520 at Evergreen Point Road is visible from Lake Washington and the highway through the Eastside is visible from hillside locations that are beyond the limits of the Eastside project area. The project area east of I-405 was not included in this analysis because restriping the highway will not affect the views; therefore, the restriping will not have an effect on visual quality or character.

What is the current visual quality of the study area?

A **landscape unit** is a place or district with clear landform or land cover boundaries that form an outdoor area with similar visual character and visual continuity. For example, a landscape unit can be a single neighborhood, or several neighborhoods combined.

Visual quality is evaluated for smaller areas within the viewshed called *landscape units*. These smaller landscape units differ from each other in that they have their own sense of place and some degree of clear views within the unit (Exhibit 5-29). Overall, visual quality for each landscape unit is described as low, moderate, or high to indicate the presence (or lack) of memorable features and the intactness of the landscape and unity of the features.





Construction Extent

Restriping Extent

Mixed Use Landscape Unit

Points Landscape Unit

Park

City Limits

N

0 500 1,000 2,000 Feet

Source: King County (2008) GIS Data (Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-29. **Landscape Units**

Medina to SR 202: Eastside Transit and HOV Project

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Points Landscape Unit

The Points landscape unit has a rural residential character with an overall moderate visual quality for most views to and from SR 520. In the vicinity of Evergreen Point Road, visual quality is high for the westward view because of the expansive view across Lake Washington with the Seattle shoreline in the middle ground and the Olympic Mountains in the distance.

Views toward the highway from residences are usually partially or fully screened by vegetation or fences. Houses below the highway typically do not have a view of the highway or its walls because of the trees along the highway, so views have an intact rural quality. Residences on hillsides in Clyde Hill and Yarrow Point have overall moderate to high quality views that are seasonally screened by vegetation. Views that contain the highway have reduced quality proportional to how much the highway dominates the view.

Views from the motorist's viewpoint are pleasant because of the rolling, curving alignment of the highway and the continuity of the tree border and canopy, which impart a rural character to the drive. The highway dominates the motorist's forward view because the highway is a wide concrete gap in the woodlands, which reduces visual quality. This is particularly noticeable at 92nd Avenue NE and Evergreen Point Road, where extra lanes for the bus stops give the highway a more urban character. Cross-highway views for motorists are obstructed by glare screens on top of medians, but the sweeping curve of the highway continually changes the forward view. The surrounding hillsides are visible from the highway and seasonal changes in vegetation from the coloring of leaves in autumn and glimpses of the bays during winter contribute to an enjoyable driving experience.

Mixed Use Landscape Unit

In the Mixed Use landscape unit, the rolling terrain of the Points landscape unit levels off to a wider, straighter highway just east of the Lake Washington Boulevard NE/Bellevue Way NE interchange. SR 520 straightens just west of the 108th Avenue NE interchange and widens because of the extra lanes and ramps for the Bellevue Way, 108th Avenue NE, and I-405 interchanges. This makes the highway the visually dominant feature for motorists. However, since the highway is elevated above the landscape, the background canopy is more visible,

creating a vegetated effect that is perhaps greater than actually exists.

Views in the Mixed Use landscape unit are more open than in the Points landscape unit because the wooded slopes that channel views in the Points unit are farther from the highway in the Mixed Use unit and, in addition, have fewer trees directly adjacent to the highway. The highway is bordered by vegetation in open roadsides, intermittent bands of tree buffers, and stormwater ponds. Because of this variability, motorists on SR 520 have partial views of the Northup Way businesses; and the business campuses to the south and the mid-rise office buildings near or up-slope from SR 520 have partial views of the highway. With the exception of a stand of mature trees along the westbound on-ramp from Bellevue, most bands of trees are a distance from the highway (around loop ramps and at the base of slopes) as far as the I-405/SR 520 interchange. Views of SR 520 from the multifamily complexes are screened by the dense canopy of street trees.

Development transitions to a highly diverse mix of small- to moderate footprint business and commercial buildings, a WSDOT maintenance facility, multifamily complexes, and parking lots. These buildings are visible to the motorist and, conversely, the highway is partially visible from most locations. The suburban character of development, combined with the wide belt of undeveloped roadside landscapes along the highway, impart an overall suburban character to this landscape unit.

Highway traffic equipment consists of electrical vaults, freeway light posts, and sign structures. Identification signs on Northup Way businesses can be seen from the highway and there is an increase in overall visual clutter to drivers in the corridor as a result of the equipment and other signage.

Overall, visual quality in the Mixed Use landscape unit varies from low to moderately low. The landscape of the basin has been altered by the construction of the highway and other development. While there are no distinctive or memorable features in views through this area, the hillside landscapes are pleasant views for motorists.

How will project construction affect visual quality and aesthetics?

Visual quality and character will change uniformly throughout the Eastside area wherever demolition and construction occur, and will be experienced by viewers looking from and toward the project. The most noticeable temporary changes to the visual character and quality of the SR 520 corridor will result from the following:

- Demolition of existing bridges
- Construction of the new highway and bridges
- Excavation outside of the existing highway
- Removal of vegetation outside of the existing highway
- Temporary erosion control measures
- Stockpiling and staging areas for materials and equipment
- Presence of construction equipment of all sizes, including haul trucks, cranes, and barges
- Temporary traffic or construction signage
- Temporary retaining or screening walls
- Nighttime construction lighting

For the duration of construction, visual quality will be reduced for all locations having a view of the work. The presence of medium- and heavy-duty construction and demolition equipment will be out of character with this area and will detract from visual quality of accustomed views. In addition, light and glare could be increased by construction equipment, especially if work is performed at night, and the loss of roadside vegetation. Vegetation loss and excavation outside the highway, to accommodate concrete form-work for structural elements and construction access, will be highly noticeable from most viewpoints and decrease the quality of those views.

Reduced visual quality could also result from increased traffic congestion during construction. Traffic slowdowns through the study area are not unusual, but the duration and frequency of such occurrences will probably increase. These effects could result from changed or reduced access, detours through

neighborhoods, the addition of construction traffic, parking, and heavy equipment. Other less obvious visual effects could result from dust and airborne debris from grading and construction.

How will project operation affect visual quality and aesthetics?

Under the Build Alternative, SR 520 would become more suburban through the Points landscape unit and trend toward urban through the Mixed Use landscape unit. Major elements that contribute to this change in visual character and quality are described in this chapter.

Points Landscape Unit

Throughout the Points landscape unit, bands of vegetation on both sides of SR 520 will be temporarily or permanently removed by widening the highway (Exhibit 5-30). Most houses are far enough from the highway that existing tree buffers and other vegetation will remain in place to screen views of the highway; however, views for some residences will change from a vegetative buffer to a retaining and/or noise wall.

Visual quality for motorists in the Points landscape unit will decrease because the highway would change from a rural residential, tree-lined corridor of moderate scale to a wider, walled corridor with large-scale transit stops at Evergreen Point Road and 92nd Avenue NE (Exhibit 5-31). The urbanization will be very noticeable to motorists and residents alike.

The lids at Evergreen Point Road, 84th Avenue NE, and 92nd Avenue NE will enclose the corridor for vehicle occupants on the highway, but will provide open connections for community users and residents (Exhibits 5-32 through 5-35). The changes in visual quality and character of the landscape unit could be perceived as positive because of the addition of landscaping over the highway, though highway users will experience enclosure within the tunnels created by the addition of the lids. Views from the communities toward the highway could also improve because lid landscapes will visually connect to and extend park and nature preserve landscapes. Landscaping at the edges of the lids will be

visible from the highway and could be an interesting and positive contribution to motorists' views as they approach the tunnels under the lids.

Existing

Visualization

Exhibit 5-30. View Looking East along NE Points Drive from West Edge of Yarrow Bay Wetlands

Existing

Visualization

Exhibit 5-31. View Looking East along Points Loop Trail from Vicinity of Hunts Point Park Tennis Courts

Existing

Visualization

Exhibit 5-32. View Looking West from Mid-span of Evergreen Point Road Overcrossing

Existing

Visualization

Exhibit 5-33. View Looking Northeast from Entrance of the Evergreen Point Road Park-and-Ride

Existing

Visualization

Exhibit 5-34. View Looking East from SR 520 Mainline toward 92nd Avenue NE Lid

Existing

Visualization

Exhibit 5-35. View Looking Southeast from Westbound Off-ramp at 92nd Avenue NE

The transit stops in the center of the highway at Evergreen Point Road and 92nd Avenue NE will be visually dominant for motorists. Structures of the transit stops could create a channel-like entrance to the tunnels under these two lids, but could also reduce the apparent width of the highway for the motorist. Transit structures include 35- to 45-foot-tall elevator shafts and stairs at the lid edge, canopies over the waiting platforms, and protective walls between highway traffic and transit riders. The protective walls will extend from the lid edge to the end of the waiting platforms. However, if designed creatively, the walls and transit stops could be perceived as an interesting addition to the corridor. The presence of noise walls will block views from the residential areas outside the highway.

Mixed Use Landscape Unit

For the most part, the redesigned interchanges at Bellevue Way NE and 108th Avenue NE will not result in noticeable changes to visual character or quality in this landscape unit because the changes will be consistent with the scale and materials of existing highway facilities. The landscape features will be similar because stormwater ponds will be rebuilt in approximately the same locations.

New stormwater ponds in the southeast corner of the Bellevue Way NE interchange will require the addition of very tall retaining walls in this corner, which will result in notable changes to views and landscape quality. These retaining walls will replace a wooded slope and will be out of scale and inconsistent with the surroundings. The walls will be a dominant feature to westbound motorists and viewers in the Northup Way area, unless the walls are screened by vegetation.

The widening of the Bellevue Way Bridge over SR 520, to accommodate a landscaped sidewalk, will improve pedestrians' experience of walking over the bridge. This landscaping will provide a buffer between vehicles and pedestrians and, also, physically and visually connect the signature boulevard plantings on Bellevue Way NE and Lake Washington. The planted edge will be visible to motorists and could be perceived as a positive contribution to views in this interchange area.

Will the project create new sources of shadow, glare, or light?

Points Landscape Unit

Overhead highway lighting, shade, and shadowing in the Points landscape unit will be somewhat greater than existing conditions. The extra width of the highway could require more illumination than the current highway does. In this case, if highway lighting is located along the outside edge of the highway, rather than in the median, the lights will be closer to homes near the highway. Shielding on the lamps and noise walls will prevent much or most of the stray light from reaching nearby residences. The loss of trees along the highway will result in greater exposure to lighting for many locations along the north side of SR 520.

Safety lighting will be located on all lids along streets and at locations where pedestrians, bicycles, and vehicles cross paths. Additional lighting will provide guidance and safety at the two transit stops and their plazas on top of the lids. Stairs and elevators, the new park-and-ride at Evergreen Point Road, and the drop-off area at 92nd Avenue NE will also require safety lighting. This lighting could be detectable by the residents near the lids, unless screened by lamp shields, noise walls, or dense shrub hedges. In addition, the bicycle tunnel at 92nd Avenue NE will be lit at all times for safety.

The glass elevator shafts and overhead canopies at the Evergreen Point Road and 92nd Avenue NE transit platforms could be other possible new sources of glare if the materials are reflective. These new sources of light and glare will most affect motorists and could be apparent night (lighting) or day (sun glare).

The tunnels under the three lids will be an appreciable change for motorists due to the potential for sharp changes in light levels. These changes can be ameliorated by using special lighting and shading vegetation near the tunnel portals.

Mixed Use Landscape Unit

Overhead lighting, shade, and shadowing will be similar to existing conditions. No new sources of glare are expected because there will be no tunnels or lids added to this portion of the project. Noise walls could block some light from the highway. Outside of the highway, shade and shadowing could change because of the loss of vegetation in some locations.

What will happen to visual quality and aesthetics if WSDOT does not build this project?

Under the No Build Alternative, visual quality would remain as it is today because no buildings, bridges, or vegetation would be removed and no landscaped lids or noise walls would be constructed. No new sources of light, glare, or shadow would be introduced in the Eastside study area under the No Build Alternative because transit stops and new traffic management signage would not be built. It is assumed that the structures, highway, and vegetation at the road edge would be maintained in their current conditions. The main agent for change would be changes in vegetation that are visible from the highway.

CHAPTER 5.9 Water Resources

Construction activities such as replacing culverts or installing retaining walls could temporarily alter the quality or flow of surface water bodies or groundwater in the study area. The completed project will add 24.2 acres of new pollution-generating impervious surface (PGIS) to the study area and treat a total of 57.1 acres of PGIS. Stormwater associated with impervious surfaces will be treated for pollutants and controlled for flow rate increases. The project will have minimal or no effect on groundwater.

Please refer to the Water Resources Discipline Report in Appendix S for additional information about the water resources analysis.

This chapter addresses water resources, including surface water bodies (e.g., lakes, rivers, and streams), stormwater, and groundwater. It addresses water quantity and water quality under the Build Alternative and No Build Alternative.

Why are water resources considered in this EA?

The Clean Water Act, passed in 1972, protects water resources in the U.S. The act was created in response to widespread public concern about controlling water pollution and protecting America's water bodies. The U.S. Environmental Protection Agency (USEPA) is the federal agency responsible for implementing and enforcing the Clean Water Act. In many cases, USEPA has delegated its authority and implementation duties to state agencies. USEPA has delegated the Washington State Department of Ecology (Ecology) to manage and protect Washington's water resources. In doing so, Ecology has adopted laws that regulate the allowable concentration of toxic substances allowed in stormwater and surface water bodies. Ecology has also developed design guidelines for constructing Ecology-approved stormwater treatment and detention facilities.

What are water resources?

The term *water resources* refers collectively to surface water bodies (for example, lakes and streams), stormwater, and groundwater.

Surface water bodies include lakes, streams, ponds, and wetlands.

Stormwater includes stormwater runoff, snowmelt runoff, and surface runoff and drainage. Drainage can flow across the ground in open ditches, in pipes, or below the surface.

Groundwater is water found underground in the saturated zone. The saturated zone is the layer of soil that is soaked, or loaded to capacity with water.

Other state and federal agencies – the Washington State Department of Fish and Wildlife (WDFW); the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries); the U.S. Army Corps of Engineers (USACE); and the U.S. Fish and Wildlife Service

(USFWS) – have developed water quality rules and guidelines that protect wetlands and fish and wildlife resources.

In addition to state and federal agency regulations, the cities and towns in the study area have adopted codes and policies that apply to water resources, wetlands, and critical areas in the project vicinity.

How did WSDOT evaluate water resources for this project?

The project team identified surface water resources in the study area by collecting and reviewing maps and government reports. The team combined several maps using geographic information system (GIS) software to create a single project base map that incorporated data on streams, lakes, wetlands, wetland buffers, soil types, floodplains, floodways, culverts, and subbasin and watershed boundaries.

The team also consulted with state and local agencies to obtain important information about study area surface water resources and stormwater. Local agencies identified existing flooding problems in the study area. The team obtained water quality information from Ecology's 303(d) list and Washington's Water Quality Assessment Report (also called the 305[b] Report).

WSDOT reviewed information about the existing stormwater system on SR 520 and obtained information from other agencies about hazardous materials, edges of existing pavement lines, and the quantity and quality of treated stormwater in the study area.

For groundwater, the team evaluated information on aquifers, recharge areas, public water supply wells, and domestic/residential water wells.

What is the Ecology 303(d) list?

The 303(d) list identifies surface water body segments (lakes, streams, and ponds) with degraded water quality. Ecology assembles available water quality data and publishes this list, as required under Section 303(d) of the federal Clean Water Act.

What is the Ecology 305(b) Report?

Ecology prepares the Section 305(b) Report to inform the U.S. Congress and the public about the current condition of the state's waters. This report describes the status of *all* waters in the state, while the 303(d) list reports only the *impaired* waters in the state.

An **aquifer** is a geologic stratum of saturated materials with the capability of yielding useable quantities of groundwater on a long-term, sustainable basis.

Recharge areas are those in which water (precipitation, surface water, or groundwater) enters and adds to an aquifer.

How does water flow through the study area?

Water flows through the study area via several pathways (see Exhibit 5-36):

- In surface water bodies such as streams, ponds, wetlands, and lakes.

- Across the surface as stormwater runoff, where it flows directly to surface water bodies, or is conveyed to surface water bodies in open ditches or drainage pipes.
- Below ground in soil and/or in the groundwater.

Although surface water bodies, stormwater, and groundwater are typically managed and regulated independently, they are interconnected and interdependent. Exhibit 5-36 shows how stormwater can move into and out of surface water bodies, runoff can percolate into soil and become groundwater, and how groundwater can move into and out of surface water bodies.

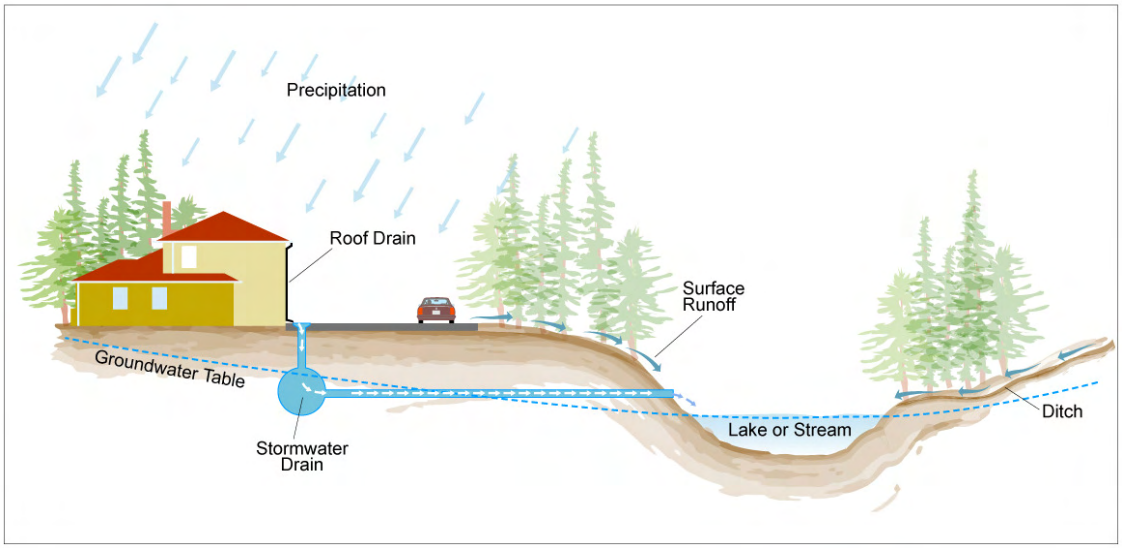


Exhibit 5-36. Pathways for Water Moving through the Study Area

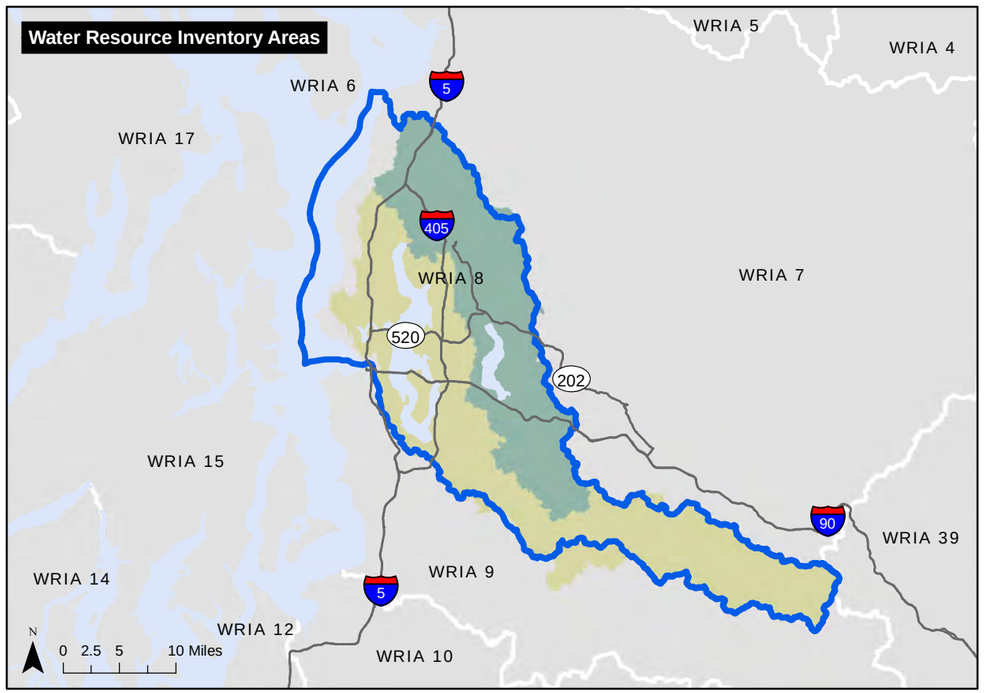
What water resources are present in the study area?

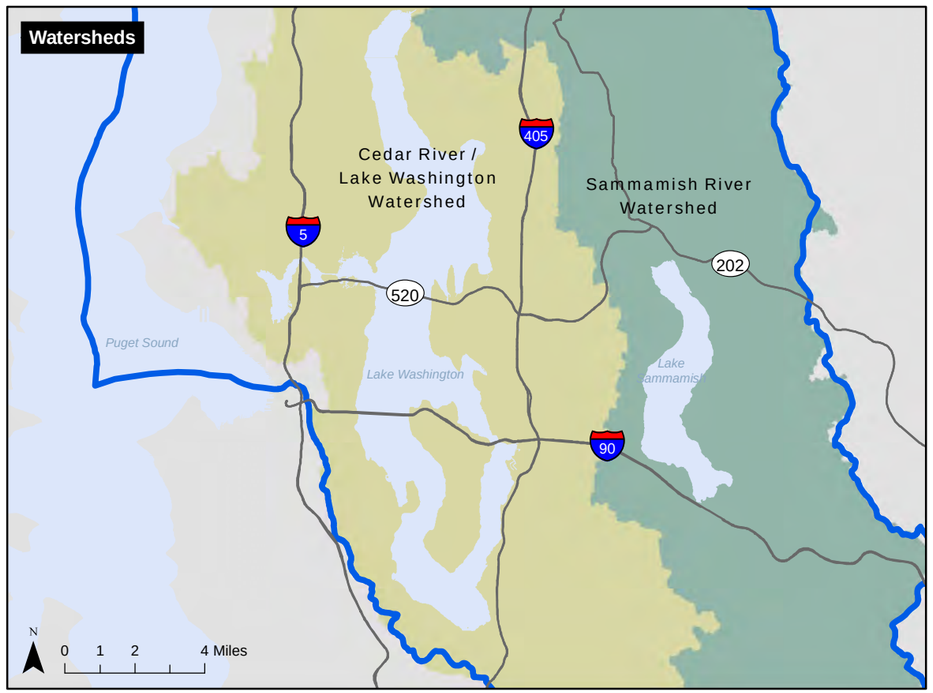
Surface Water

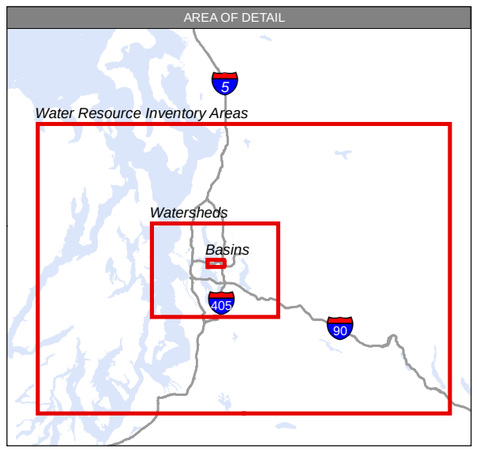
Exhibit 5-37 shows the surface water bodies in the study area: Lake Washington, Fairweather Creek, Unnamed Tributary to Fairweather Bay, Cozy Cove Creek, and Yarrow Creek (including the east and west tributaries). These water bodies are located in developed suburban areas where impervious surfaces cover 30 to 33 percent of the stream basins.

How does impervious surface affect surface water resources?

Impervious surfaces such as rooftops, sidewalks, roads, parking lots, and compacted urban soils prevent rain from infiltrating soils as it would naturally. These barriers shift more water into creeks and lakes, and can increase the transport of pollutants from land to adjoining surface waters.







Water Resource Inventory Area 8 Boundary

Water Resource Inventory Area

Watershed

Cedar River / Lake Washington Watershed

Sammamish River Watershed

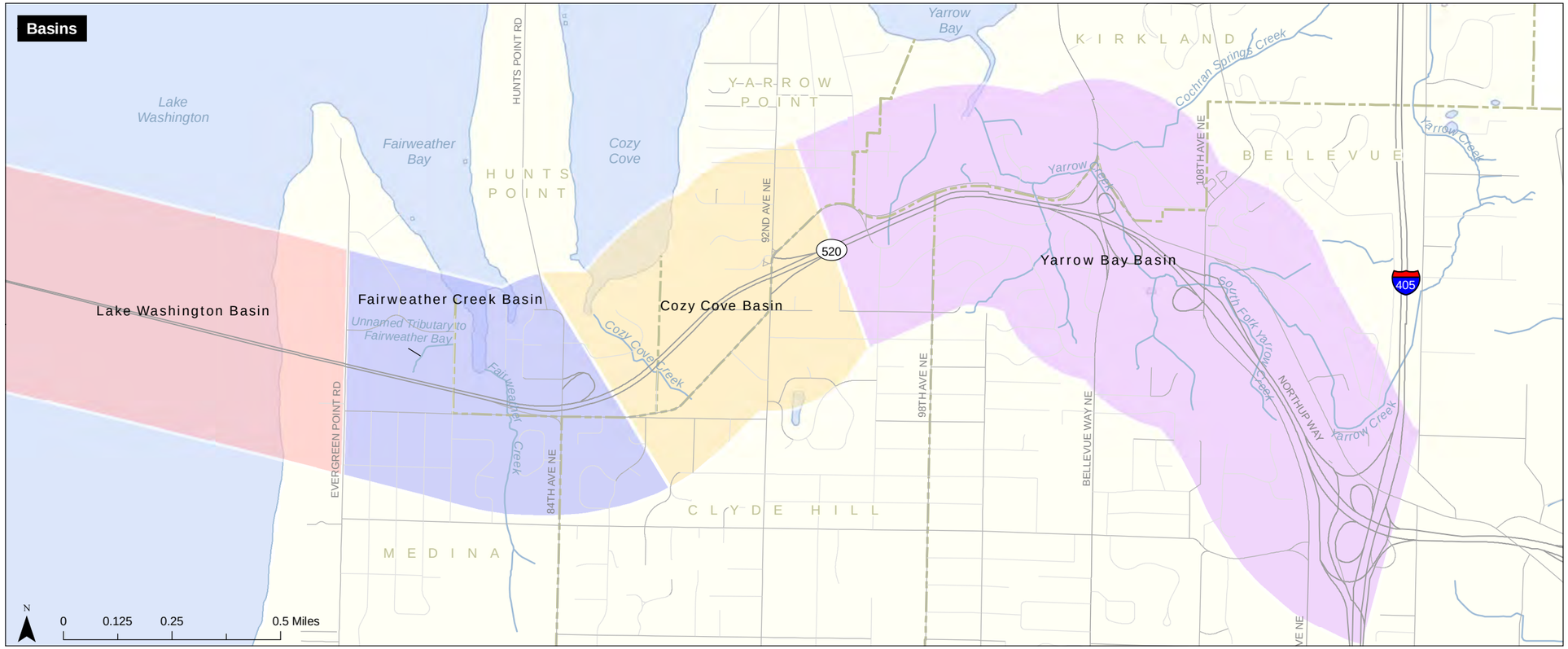
Creek Basin

Lake Washington

Fairweather Creek

Cozy Cove

Yarrow Bay



Source: King County (2008) GIS Data (Highways, Water Bodies), Washington Department of Ecology (2000) GIS Data (WRIA). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.

Exhibit 5-37. **Location of Affected Watersheds, Basins and Creeks**

Medina to SR 202: Eastside Transit and HOV Project

The Federal Emergency Management Agency (FEMA) flood rate insurance map for the study area does not show any 100-year floodplains associated with Fairweather Creek or Cozy Cove Creek. Fairweather Creek and its historical floodplain are currently disconnected because the stream is confined by high, steep banks along much of its length (Anderson et al. 2001). The FEMA flood insurance rate map for Yarrow Creek shows no floodplains for the section of stream located in the study area.

The **100-year floodplain** is the area that would be inundated by a flood having a 1-percent chance of occurring in any given year.

Overall, stormwater management in the study area takes place as follows:

- Currently, stormwater runoff discharged from SR 520 is not treated prior to discharge.
- Stormwater runoff in the study area discharges to either Lake Washington or to a series of small streams that ultimately drain to Lake Washington, the major receiving water body.

How do state agencies regulate stormwater management and increases in impervious surface?

Current state regulations require new and redeveloping construction projects to treat stormwater and sometimes control the flow of stormwater from existing and new impervious surfaces.

Groundwater

In Washington, all groundwater is considered a potential drinking water source, and the State regulates the quality of this resource to protect it from degradation. However, the use of groundwater as a drinking water supply is limited within the study area. Seattle Public Utilities supplies most of the drinking water in the study area from three primary sources—Chester Morse Reservoir, South Fork Tolt Reservoir, and the Highline Well Field (located in the Renton area). Although there are water wells of record in the area, they are generally located in areas supplied by municipal water and are most likely not used for drinking water supply.

Groundwater in the study area is contained within aquifers overlain by other geologic deposits. The aquifers are exposed (and thus susceptible to contamination) at 80th Avenue NE and 86th Avenue NE, at 96th Avenue NE, and between 95th Avenue NE and Bellevue Way NE/104th Avenue NE.

What is the existing condition of water resources in the study area?

Surface Water


Cozy Cove Creek

In general, the overall quality of surface water bodies in the study area is listed by Ecology as impaired because of high temperatures and bacterial contamination.

- **Lake Washington.** As indicated on the 2009 303(d) list, Lake Washington exceeded the water quality criteria for fecal coliform in a section adjacent to and just north of Hunts Point.
- **Fairweather Creek.** Ecology placed Fairweather Creek on the 303(d) list because the stream exceeded the water quality criteria for fecal coliform, dissolved oxygen, and temperature (Ecology 2009).
- **Unnamed Tributary to Fairweather Bay.** This stream has not been listed for exceedences on the Ecology 303(d) list (Ecology 2009).


Main Stem of Yarrow Creek

- **Cozy Cove Creek.** Little is known about the water quality of Cozy Cove Creek because this stream was not rated in the 303(d) water quality classification system. The stream receives runoff from landscaped lawns, residential streets, and SR 520.
- **Yarrow Creek.** Yarrow Creek is on the Ecology 303(d) list because it exceeds the water quality criteria for dissolved oxygen and fecal coliform (Ecology 2009).

Groundwater

In general, groundwater quality in the study area is good and suitable for most purposes (Vaccaro et al. 1998).

How will project construction affect water resources?

Surface Water

The team evaluated temporary construction effects on surface water bodies by determining construction actions that might disturb soil and in-water sediments, and by evaluating the potential for accidental spills of hazardous materials.

Under the Build Alternative, water quality in Eastside streams could be temporarily affected by construction activities such as replacing or extending culverts and installing retaining walls. Construction activities occurring within or directly adjacent to streams could temporarily increase turbidity levels.

Turbidity is a condition caused by suspended sediments or floating material that clouds the water and makes it appear dark and muddy.

Groundwater

Potential effects on groundwater during construction of the Build Alternative will be related to the disturbed area footprint during construction or dewatering activities (see below).

Construction of roadways and bridges could temporarily alter the flow of groundwater. For example, groundwater could be affected by the use of dewatering wells to lower groundwater levels to allow subsurface construction in a dry environment. This could cause a temporary reversal of groundwater flow toward the construction area; however, these effects will be localized and temporary.

How will project operation affect water resources?

Surface Water

Construction and operation of the Build Alternative will result in an increase of 24.2 acres pollution-generating impervious surfaces (PGIS). The project will treat 24.2 acres of new PGIS and 32.9 acres of replaced PGIS, for a total of 57.1 acres of PGIS. The 57.1 acres of PGIS will be treated for stormwater pollutants and controlled to prevent flow increases, as required by the Highway Runoff Manual (WSDOT 2008a). Treatment of 57.1 acres of PGIS will improve water quality of the receiving water bodies in the study area.

Pollution-generating impervious surfaces (PGIS) are impervious surfaces that are a source of pollutants in stormwater runoff. Study area PGIS includes roadways that receive direct rainfall or the run-on or blow-in of rainfall.

Groundwater

The Build Alternative will have minimal or no effect on the quantity or quality of study area groundwater.

The increased impervious surface associated with the Build Alternative will also have minimal or no effect on groundwater recharge because the roadway will be only a fraction of the size of the total recharge area of the groundwater system. The size of the associated groundwater

basins is unknown, but typically groundwater basins are much larger than surface water basins.

What will happen to water resources if WSDOT does not build this project?

Surface Water

Because no construction will occur under the No Build Alternative, no effects to water resources would result. Under the No Build Alternative, stormwater runoff from SR 520 within the study area would continue to be discharged to streams with no treatment or flow control. Compared with existing levels, the higher traffic volumes that would occur between 108th Avenue NE and I-405 between 2002 and 2030 could increase pollutant loading (for example, copper and zinc from automobile tires and brakes) from project corridor pavement.

Groundwater

Because no construction would occur under the No Build Alternative, no effects to groundwater would result. There would be no change in the quantity or quality of study area groundwater under the No Build Alternative. The No Build Alternative would not change the amount or quality of stormwater percolating to the groundwater.

CHAPTER 5.10 Section 4(f) Resources

Section 4(f) resources within the study area include the Points Loop pedestrian/bicycle trail, four parks, and three historic properties eligible for listing in the National Register of Historic Places (NRHP). Construction and operational activities of the proposed project wouldl havea de minimis *use of two of the parks (Fairweather Park and Wetherill Nature Preserve), and the Points Loop Trail would meet the exception for trails located within existing transportation right of way. In addition, the analysis demonstrates there would be no Section 4(f) use of the two other parks located within the study area (Hunts Point Park and Yarrow Bay wetlands), but there will be temporary occupancy. Finally, there would be no Section 4(f) use of the three historic properties.*

Please refer to the Section 4(f) Technical Memorandum in Appendix T for additional information about this analysis.

The intent of the Section 4(f) statute and U.S. Department of Transportation policy is to avoid the use of significant public parks, recreation areas, wildlife and waterfowl refuges, and historic sites as part of a project unless there is no feasible and prudent alternative to the use of such land.

Introduction

Section 4(f) of the Department of Transportation Act of 1966 (49 USC Section 303) prohibits the Federal Highway Administration (FHWA) from approving a project or program that uses land from a significant public park, recreation area, wildlife or waterfowl refuge, or historic site unless:

- There is no feasible and prudent avoidance alternative to the use of the land; and
- The project includes all possible planning to minimize harm to the property; or
- The project will not have more than a "*de minimis* impact" on the property.

Section 4(f) allows for some exceptions to the law, including temporary occupancy and trails located within a transportation right of way

Temporary Occupancies

Temporary occupancies of land that are so minimal as to not constitute a use within the meaning of Section 4(f) are exempt from Section 4(f) approval (23 Code of Federal Regulations [CFR]--Part 774.13[d]). In order for a temporary occupancy to meet the exemption, the following conditions must be satisfied:

1. Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;
2. Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;
3. There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;
4. The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and
5. There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

Trails within Right of Way

23 CFR 774.13(f)(3) identifies an exception to the requirement for Section 4(f) approval for certain "trails, paths, bikeways, and sidewalks that occupy a transportation facility right of way without limitation to any specific location within that right of way, so long as the continuity of the trail, path, bikeway, or sidewalk is maintained."

De Minimis

In accordance with 23 CFR Part 774, FHWA's "Guidance for Determining *De Minimis* Impacts to Section 4(f) Resources" states "…once the U.S. Department of Transportation (DOT) determines that a transportation use of Section 4(f) property, after consideration of any impact avoidance, minimization, and mitigation or enhancement measures, results in a *de*

minimis impact on that property, an analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete."

For *de minimis* to be applicable, a project must meet specified impact criteria. The criteria and associated determination requirements are different for parks, recreation areas, and wildlife and waterfowl refuges than for historic properties:

- *De minimis* impacts on publicly owned parks, recreation areas, and wildlife and waterfowl refuges are defined as those that do not "adversely affect the activities, features and attributes" of the Section 4(f) resource.
- *De minimis* impacts related to historic properties are defined as impacts that result in a determination of either "no adverse effect" or "no historic properties affected" in compliance with Section 106 of the National Historic Preservation Act (NHPA).

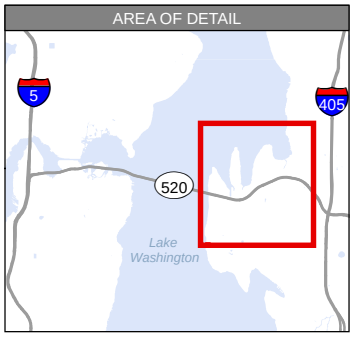
Affected Environment and Findings

Parks and Recreational Resources

A pedestrian/bicycle trail and four parks are located in the study area: Points Loop Trail, Fairweather Park, Hunts Point Park, Wetherill Nature Preserve, and Yarrow Bay wetlands. These recreational resources are shown in Exhibit 5-38.

Points Loop Trail

Points Loop Trail is a 5.4-mile trail that links the communities of Medina, Hunts Point, Clyde Hill, and Yarrow Bay. It includes 1.6 miles of off-street trails, 2.4 miles of streets with sidewalks, and 1.4 miles of trail along residential streets. In the project area, the Points Loop Trails is located completely within the WSDOT right of way and parallels SR 520, passing along the south side of Fairweather Park, Hunts Point Park, and Wetherill Nature Preserve WSDOT has General Maintenance Agreements with the adjacent communities to ensure upkeep and policing of the trail within WSDOT right of way. In some areas, the trail would be expanded beyond the existing right of way and into adjacent parks. In these cases, FHWA has determined the use of parks would be a *de minimis* use, discussed in the following sections by individual park resource.



- Bicycle/Pedestrian Path
- Historic Property
- Parks and Recreation Areas within Study Area
- Park beyond Study Area
- City Limits

N

0 500 1,000 2,000 Feet

Source: City of Bellevue (2008) GIS Data (Paths), King County (2008) GIS Data (Parks, Streams, Streets, Water Bodies), CH2M HILL (2008) GIS Data (Parks). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-38. **Section 4(f) Resources**

Medina to SR 202: Eastside Transit and HOV Project

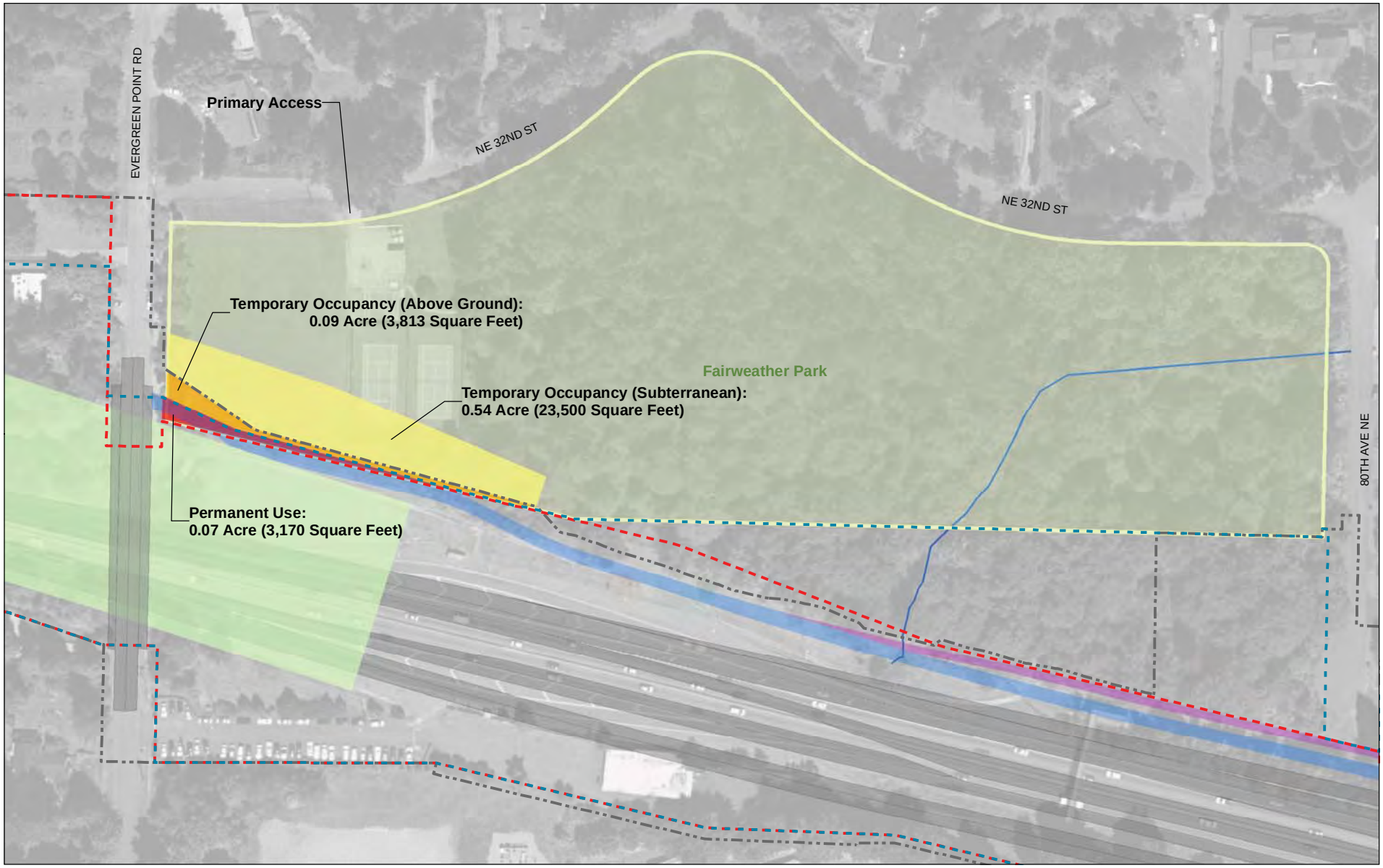
The sections of the trail located within the WSDOT right of way would need to be relocated and rebuilt as part of the project, and would meet the exception for trails located within existing transportation right of way under 23 CFR 774.13(f)(3). During construction, the trail would follow detour routes using local streets, ensuring that the continued use and continuity of the trail would not be impaired. Detour routes for sections of the existing trail could be needed for 4 to 12 months, depending on the construction activity adjacent to the relocated trail.

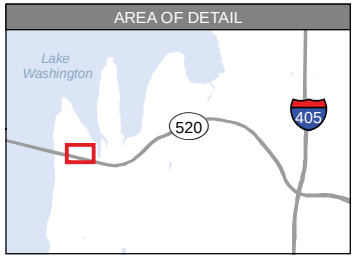
The highway construction would require removal of existing vegetation between the trail and SR 520; this vegetation enhances the recreational experience for trail users and serves as a buffer from the highway. Replacement of the vegetation strip with noise wall may affect the character of the trail. However, WSDOT will retain the vegetation along the trail on the opposite side from SR 520 where practicable, including the mature trees between the trail and Wetherill Nature Preserve. In addition, WSDOT will also replant exposed areas and add landscape planters to break up the wall where practicable. The proposed noise walls would reduce noise levels in 2030 by 5 to 15 A-weighted decibels (dBA) compared with existing conditions and by 6 to 16 dBA compared with the No Build Alternative. As a result, the change in character of the trail is not anticipated to be so severe that it would impact the continued use of the trail. Many trail users may experience a more comfortable experience with the reduction in noise levels (WSDOT 2009b).

Fairweather Park

Fairweather Park is a public park in Medina consisting of 11 acres of forested open space. The terrain ranges from upland forest to wetland, and is bisected by a spring-fed stream. Tennis courts and a small grassy playfield are in the western area of the park.

Approximately 0.07 acre in the southwest corner of the park would be acquired and be permanently converted to the relocated Points Loop Trail/regional bike trail; the Points Loop Trail and the proposed regional bike trail merge together within the park (Exhibit 5-39). This affected area comprises less than 1 percent of the total park area and is located in the passive use area of the park.





- Temporary Occupancy (Above Ground)
- Temporary Occupancy (Subterranean)
- Permanent Use
- Proposed Pavement
- Proposed Lid
- Limits of Construction
- Proposed Regional Bicycle/ Pedestrian Path
- Proposed Points Loop Trail
- Park
- Existing Right of Way
- Proposed Right of Way

N

0 50 100 200 Feet

Source: King County (2006) Aerial Photo, King County (2005) GIS Data (Stream), CH2M HILL (2008) GIS Data (Park), City of Bellevue (1999) GIS Data (City Limits), and King County (2004) GIS Data (City Limits). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-39. **Fairweather Park**

Medina to SR 202: Eastside Transit and HOV Project

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The new Evergreen Point Road lid would have beneficial visual effects on the park. This landscaped lid over SR 520 would increase green space adjacent to the park and would provide a new entrance to the park from the reconstructed Evergreen Point Road crossing of SR 520. The proposed noise walls would reduce noise levels in 2030 by 5 to 15 dBA compared to existing conditions and by 6 to 16 dBA compared to the No Build Alternative.

During construction, an additional 0.63 acre of the southwest corner of the park would be temporarily occupied for construction of the Evergreen Point Road lid and relocation of the Points Loop Trail. Of the 0.63 acre of temporary occupancy, 0.54 acre would be subterranean and would accommodate tiebacks of metal or fiberglass rods. These tiebacks will support temporary shoring walls during construction of the permanent lid abutments/retaining walls. The tiebacks are anticipated to be a minimum of 4 to 5 feet below the surface. No surface uses will be impacted in this subterranean area. During construction, the 0.09 acre of above ground temporary occupancy would be fenced off and not available to park users for up to 18 months. Because the park entrance is at the north boundary of the park, access and use of the park would continue during construction, and use of the tennis courts would not be affected. The affected area is primarily vegetated with shrubs and grasses. After construction, the area would be regraded and revegetated. During construction, the park would experience temporary construction effects such as noise and fugitive dust. However these effects would not havea severe effect on the park's activities, features, or attributes.

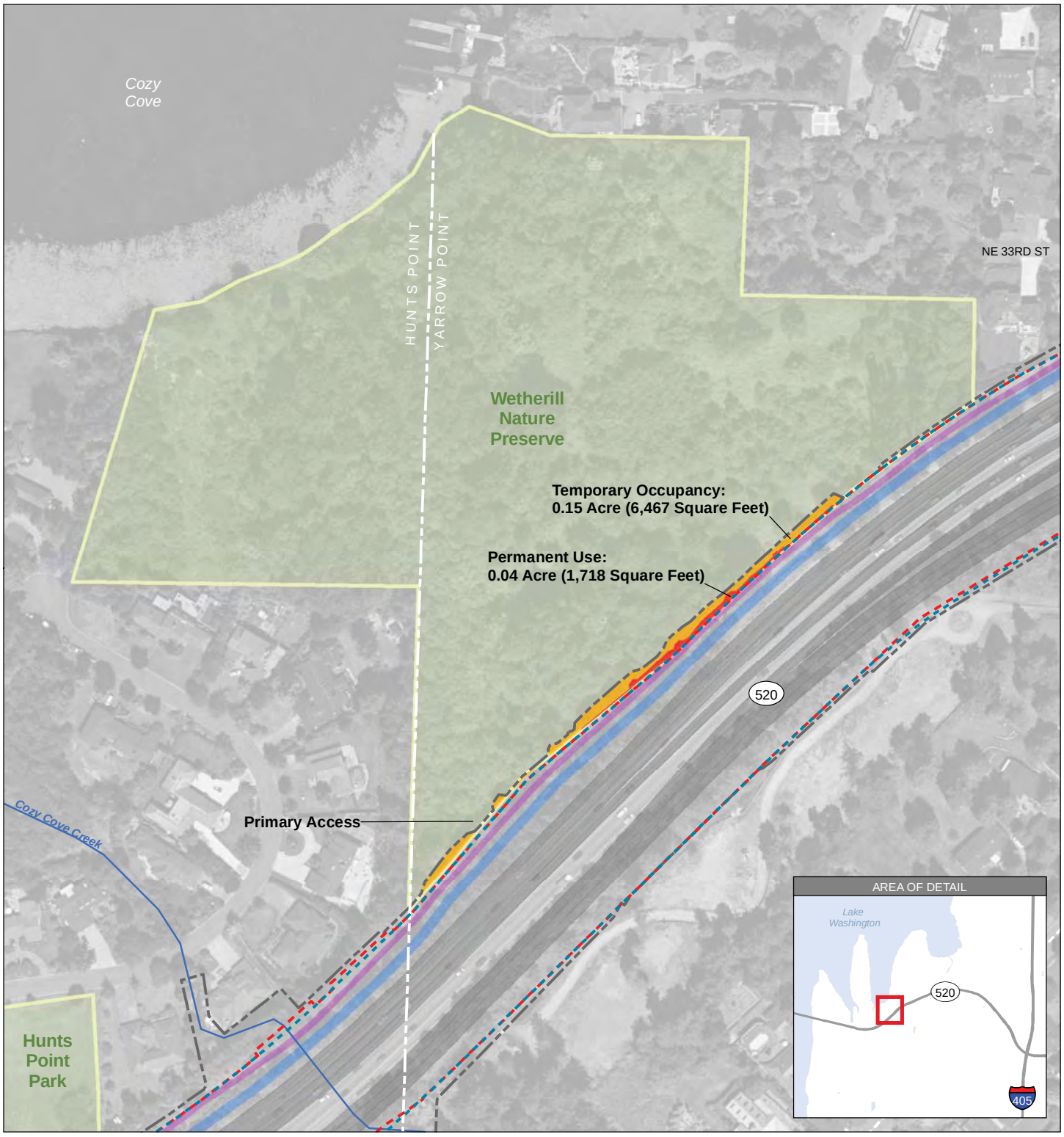
For the reasons noted above, the project will have a *de minimis* impact on the Fairweather Park. Based on FHWA guidance for determining *de minimis* impacts (FHWA 2005), the agency with jurisdiction over the Section 4(f) resource must concur that the project effects would not adversely affect the activities, features, and attributes of the Section 4(f) resource. WSDOT has met with the Medina Park Board to discuss the project and its effects on Fairweather Park. Coordination with the park board and City of Medina is ongoing, and more meetings are planned in the coming months. They have been supportive of the proposed project and the benefits that the park will

experience. A letter expressing concurrence with the *de minimis* finding from the City of Medina as the agency with jurisdiction over the park will be received before the final decision document is completed.

Wetherill Nature Preserve

The 16-acre Wetherill Nature Preserve was donated to the towns of Hunts Point and Yarrow Point in 1988 with the requirement that the towns protect the land in perpetuity from development and preserve its native wildlife and plants. Today, many trees and shrubs in the park are labeled, and extensive plant and animal lists are provided at the entrance kiosk. A number of pedestrian-only trails wind through the park and provide waterfront views. The parkland is privately maintained through volunteer efforts and contributions. The Points Loop Trail is located immediately adjacent to the south side of the park within the WSDOT right of way and connects to pedestrian paths within the preserve. The project would widen the highway, which requires construction of retaining walls which in turn require reconstruction of the trail with upgrades for Americans with Disabilities Act (ADA) accessibility. In order to meet acceptable ADA criteria, landings are proposed for users to rest at 100-foot intervals in sections of 10% grade and at 50-foot intervals in sections of 11% grade. To accommodate this change, approximately .04 acre of the Wetherill Nature Preserve along the border of SR 520 would be acquired and permanently converted to the relocated Points Loop Trail. This affected area comprises less than 1 percent of the total park area.

During construction, an additional 0.15 acre of the park would be temporarily occupied for the relocation and reconstruction of the Points Loop trail along the southern boundary of the park adjacent to the SR 520 right of way. Access to pedestrian paths within the park would be maintained during project construction. This area would be fenced off for safety and not available to park users for up to 12 months (Exhibit 5-40). Movable vegetative screening would be used to visually screen the park from construction activities during this period. During construction, the park would experience temporary construction effects such as noise and fugitive dust. However these effects would not have a severe effecton the park's activities, features, or attributes.



Temporary Occupancy
Permanent Use
Proposed Pavement
Proposed Lid
Limits of Construction
Proposed Regional Bicycle/ Pedestrian Path
Proposed Points Loop Trail
Park
Existing Right of Way
Proposed Right of Way

N
0 50 100 200 Feet

Source: King County (2006) Aerial Photo, King County (2005) GIS Data (Stream), CH2M HILL (2008) GIS Data (Park), City of Bellevue (1999) GIS Data (City Limits), and King County (2004) GIS Data (City Limits). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-40. **Wetherill Nature Preserve**

Medina to SR 202: Eastside Transit and HOV Project

For the reasons noted above, the project will have a *de minimis* impact on the Wetherill Nature Preserve. Based on FHWA guidance for determining *de minimis* impacts (FHWA 2005), the agency with jurisdiction over the Section 4(f) resource must concur that the project effects would not adversely affect the activities, features, and attributes of the Section 4(f) resource. WSDOT has met with the Wetherill Nature Preserve Commission to discuss the project and its effects on the preserve. Coordination with the park commission and towns of Hunts Point and Yarrow Point are ongoing, and they have been supportive of the proposed project. Letters from these agencies with jurisdiction over the preserve expressing concurrence with the *de minimis* finding will be received before the final decision document is completed..

Hunts Point Park and Yarrow Bay Wetlands

Hunts Point Park, also known as D.K. McDonald Park, encompasses roughly 2.5 acres in the south part of the Town of Hunts Point. Park amenities include tennis courts, a children's play area, an open sports area, and benches. The parkland was originally acquired from the Bellevue School District and named after long-time resident D. K. McDonald, who purchased enough bonds to finance construction of the park. The park also contains the Town Hall.

The Yarrow Bay Wetlands is a 73-acre wildlife conservancy area that can be explored either by nonmotorized craft, such as canoes and kayaks, or by following one of two trails that border the park. The park is located at the south end of Kirkland. Although most of the Yarrow Bay Wetlands can only be explored by boat, a land route is accessible from a small parking lot at 101st Way NE and NE Points Drive just north of SR 520. The parking lot leads to a trail with interpretive signs.

The project would result in no permanent acquisition of Hunts Point Park or Yarrow Bay Wetlands. However, there would be temporary occupancy in each of these parks during project construction. In Hunts Point Park, 0.03 acre (1 percent of the total park area) in the southeast corner of the park adjacent to Hunts Point Road would be regraded as part of the roadway construction (Exhibit 5-41). In the Yarrow Bay Wetlands, 0.22 acre (less than 1 percent of the total park area) would have to

be accessed for construction of a two culverts with outflow beneath NE Points Drive (Exhibit 5-42). The temporary occupancy in each of these parks would be up to 1 year in duration. Areas disturbed during construction would be revegetated. The temporary occupancy of these parks would not constitute a Section 4(f) use of these resources as outlined in 23 CFR—Part 774.13(d). As noted earlier, 23 CFR--Part 774.13[d] requires documented agreement by the official(s) with jurisdiction over the Section 4(f) resource with the evaluation that the temporary occupancy is so minimal that it does not constitute a use within the meaning of Section 4(f). Coordination with the towns of Hunts Point and Yarrow Point, and the City of Kirkland is ongoing. Letters of agreement from these municipalities will be received before the final decision document is completed.

Because of the proposed noise walls, future noise levels in these three parks are expected to be lower than current levels. The proposed lid over SR 520 at 84th Avenue NE would serve as an extension of Hunts Point Park and enhance the open space and community connections that these parks provide. Therefore, the proximity effects would not constitute a constructive use that would substantially impair the activities, features, or attributes of these park resources.

For the reasons noted above, there would be no Section 4(f) use of these parks.

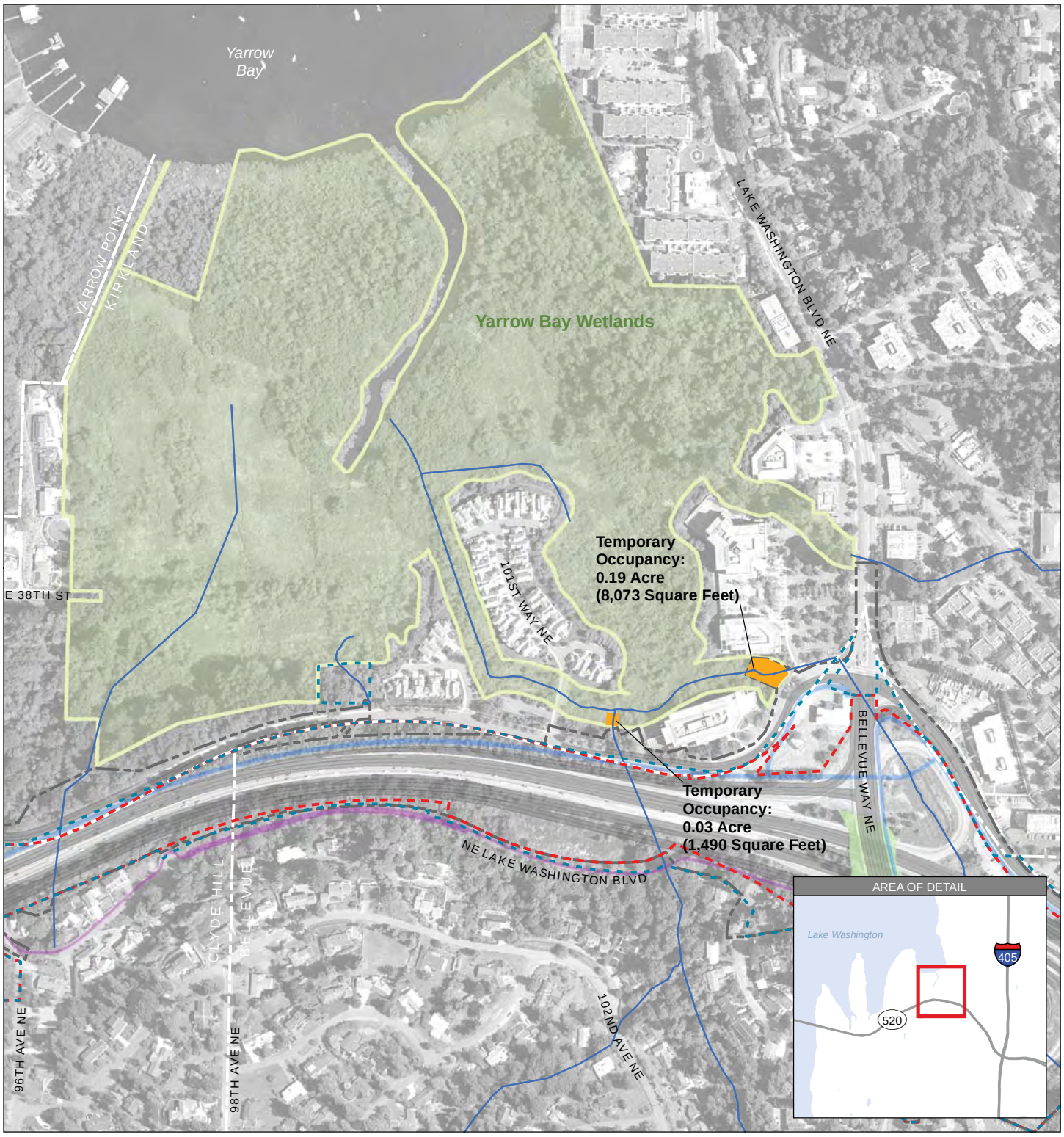
Temporary Occupancy
Proposed Pavement
Proposed Lid
Limits of Construction
Proposed Regional Bicycle/ Pedestrian Path
Proposed Points Loop Trail
Park
Existing Right of Way
Proposed Right of Way

N
0 50 100 200 Feet

Source: King County (2006) Aerial Photo, King County (2005) GIS Data (Stream), CH2M HILL (2008) GIS Data (Park), City of Bellevue (1999) GIS Data (City Limits), and King County (2004) GIS Data (City Limits). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-41. **Hunts Point / D. K. McDonald Park**

Medina to SR 202: Eastside Transit and HOV Project



Temporary Occupancy
Proposed Pavement
Proposed Lid
Limits of Construction
Proposed Regional Bicycle/ Pedestrian Path
Proposed Points Loop Trail
Park
Existing Right of Way
Proposed Right of Way

N
0 125 250 500 Feet

Source: King County (2006) Aerial Photo, King County (2005) GIS Data (Stream), CH2M HILL (2008) GIS Data (Park), City of Bellevue (1999) GIS Data (City Limits), and King County (2004) GIS Data (City Limits). Horizontal datum for all layers is NAD83(91); vertical datum for layers is NAVD88.

Exhibit 5-42. **Yarrow Bay Wetlands**

Medina to SR 202: Eastside Transit and HOV Project

Historic/Cultural Resources

A Historic Built Environment Cultural Resources Technical Memorandum (see Appendix K) for the SR 520, Medina to SR 202: Eastside Transit and HOV Project was prepared and submitted to the State Historic Preservation Officer (SHPO) in September 2009. A total of three historic properties eligible for listing in the National Register of Historic Places (NRHP) were identified and recorded within the area of potential effects (APE):

- 2851 Evergreen Point Road, Medina—James Arntson House
- 10606 Northup Way, Bellevue—BurgerMaster
- 7800 NE 28th Street, Medina—Bellevue Christian School

The location of these properties is shown in Exhibit 5-38. Section 4(f) historic properties are limited to properties listed in or eligible for listing in the NRHP. No archaeological, cultural, or traditional cultural properties listed in or eligible for the NRHP were identified in the APE.

The project alternatives will have minimal effect on the characteristics of these identified historic properties and will not adversely affect their activities, features, or attributes. The SHPO concurred on November 4, 2009 that project actions will have No Effect or No Adverse Effect on these historic properties (see Appendix B, Agency and Tribal Correspondence).

2851 Evergreen Point Road, Medina—James Arntson House

This Modern-style residence was constructed in 1953. It is eligible for listing in the NRHP under Criterion C for its distinctive architectural characteristics, which are uniquely representative of its mid-century period. The new Evergreen Point Road lid would have beneficial visual and audible effects on the Arntson House. This landscaped lid would increase green space adjacent to the property and reduce the visibility of SR 520 from the property, which would partially restore the original setting of the house, and it would decrease the noise level from the operation of SR 520. During

construction, the property may experience temporary construction effects such as construction noise and fugitive dust. During construction, driveway access to the property would be maintained. None of these effects would impact the integrity of the Arntson House or the characteristics that qualify it for the NRHP; it would experience No Adverse Effects from the project. There will be no use of the property.

10606 Northup Way, Bellevue—BurgerMaster

BurgerMaster restaurants were founded by Phil Jensen in Seattle in 1952. The Bellevue BurgerMaster building is architecturally significant as a rare surviving example of Googie-style roadside architecture. It maintains very good integrity, including its monument sign topped with a neon steer head. Its design embodies distinctive, identifiable characteristics of the style, such as cantilevered canopies, diagonal metal supports, a butterfly roof, distinctive lighting, and a period monument sign with neon. It is eligible for the NRHP under Criterion C for its architectural significance and unique defining characteristics. During construction, the property may experience temporary construction effects such as fugitive dust and limited access during non-business hours. None of these effects would impact the integrity of BurgerMaster or the characteristics that qualify it for the NRHP; BurgerMaster would experience No Adverse Effects from the project. There will be no use of the property.

7800 NE 28th Street, Medina—Bellevue Christian School

Originally built as the Three Points Elementary School in 1961, this collection of Modern buildings was designed by the noted Seattle architectural firm of Narramore, Bain, Brady and Johanson, now known as NBBJ. Founded in 1943, NBBJ became a regional leader in the Pacific Northwest. Over the years, the firm has grown to become the third largest design practice in the United States and the fifth largest in the world.

The complex, which is currently leased by the private Bellevue Christian School for use as an elementary school, has had few alterations and is intact and well maintained. It will meet the 50-year age criterion in 2011. At that time, it will be eligible for

the NRHP under Criterion C for its distinctive architectural characteristics, representational of educational design theories of its period, and as the work of a masterful, world-renowned architectural firm. The Bellevue Christian School would receive beneficial effects from the new Evergreen Point Road lid and new noise walls, which would reduce the existing noise level. The school will experience a visual effect from the presence of the new noise walls, but because the walls will also serve to visually screen the school from part of SR 520, to which it is currently exposed, the visual change from the new noise walls would not be adverse. None of these effects would impact the integrity of the Bellevue Christian School or the characteristics that qualify it for the NRHP; it will experience No Adverse Effects from the project.

CHAPTER 5.11 Indirect and Cumulative Effects

WSDOT did not identify any significant indirect effects on any resource. The Build Alternative would have a negligible contribution to the cumulative effects of past, present, and future actions.

Please refer to the Indirect and Cumulative Effects Technical Memorandum in Appendix U for additional information about the indirect and cumulative effects analysis.

This chapter describes indirect and cumulative effects expected to be associated with the proposed SR 520, Medina to SR 202: Eastside Transit and HOV Project. Appendix U, Indirect and Cumulative Effects Technical Memorandum, provides more detail, including analytic methods and discussion of past, present, and reasonably foreseeable future actions that could add to or interact with the direct and indirect effects of the project to produce cumulative effects. WSDOT is required to disclose cumulative effects and to suggest practical mitigation options that could be taken by the responsible parties (WSDOT et al. 2008).

What are indirect and cumulative effects?

The other sections of Chapter 5 explain how project construction and operation could directly affect a range of environmental resources. This chapter describes two other kinds of environmental effects: indirect effects and cumulative effects.

Federal regulations (40 CFR 1502.16, 1508.7, 1508.8) implementing the National Environmental Policy Act (NEPA) require that indirect and cumulative effects be considered in NEPA documents because they inform the public and decision-makers about possible unintended consequences of a project that are not always revealed by examining only the direct effects of the individual project under review. This information helps project planners, designers, and builders to mitigate direct effects under their control in ways that can make adverse indirect and cumulative effects less likely and less severe.

Indirect effects (sometimes called secondary impacts or effects) are defined as effects that:

... are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may

include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 Code of Federal Regulations [CFR] 1508.8).

Indirect effects result from one project but, unlike direct effects, typically involve a chain of cause-and-effect relationships that can take time to develop and can occur at a distance from the project site. This makes indirect effects difficult to accurately predict and usually requires a qualitative estimate more general than predictions of direct effects.

Cumulative effects (also called cumulative impacts) are defined as:

... the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

A cumulative effect is the project's direct and indirect effects on a particular resource, combined with the past, present, and future effects of other human activities on that same resource. The result is the expected future condition of the resource when all of the external factors known or likely to affect it are taken into account.

Why are indirect and cumulative effects considered in this EA?

As noted above, indirect effects are tied to the direct effects described in early sections of this EA. The analysts looked at interactions between the project's effects to identify ways in which the project contributed to effects further removed in time or place.

The analysts identified cumulative effects by following the *Guidance on Preparing Cumulative Impact Analyses* (WSDOT et al. 2008) and by reviewing plans and policies developed by the Puget Sound Regional Council (PSRC), including *Vision 2040* (PSRC 2008), the *Transportation 2040 Draft EIS* (PSRC 2009b),

and the 2010 to 2013 Transportation Improvement Program projects. Many land development and transportation projects are under construction or planned for construction in the reasonably foreseeable future. The analysts reviewed trends from past and present actions and then considered the action in light of the trend plus reasonable future actions. This chapter summarizes the conclusions of the analysis; additional detail about the analysis of indirect and cumulative effects may be found in Appendix U, Indirect and Cumulative Effects Technical Memorandum.

What are the potential indirect and cumulative effects of the project?

Air Quality

What indirect effects would the project likely have on air quality?

Construction of the project could produce indirect effects on air quality if emissions or particulates were dispersed to locations distant from the construction zone; these effects would be temporary and limited to the construction period. No permanent indirect effects are expected to occur as a result of the project.

How would the project contribute to a cumulative effect on air quality?

Project construction activities would make a small, short-term contribution to an incremental effect on air quality by emitting exhaust gases and particulates into the atmosphere. Emissions from project construction activities would combine with other emissions from sources within the region. This incremental effect would be temporary and is not expected to cause a change from the baseline condition or a violation of the National Ambient Air Quality Standards (NAAQS).

During project operation, vehicles using the SR 520 corridor would release exhaust emissions into the atmosphere. It should be understood, however, that this happens now, and that the transit expansion and HOV lanes provided by the project would decrease the cumulative exhaust emission below the level expected under the No Build Alternative. The

analysis shows that the project will produce an incremental improvement in air quality.

Because the Build Alternative would be a major transportation project located in a maintenance area for carbon monoxide (CO), it would be subject to transportation conformity requirements. The intent of transportation conformity is to ensure that new projects, programs, and plans do not impede an area from meeting and maintaining air quality standards. Conformity with the State Implementation Plan (SIP) means that transportation activities will not produce new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. Because it is not anticipated that the project will create any new violations, nor increase the frequency of an existing violation of the CO standard, it would conform with the purpose of the current SIP and the requirements of the federal Clean Air Act and the Washington Clean Air Act. As a "regionally significant" project, the proposed project is also included in the current Regional Transportation Plan (RTP), *Destination 2030* (PSRC 2007), in the action alternatives evaluated in the *Transportation 2040 DEIS* (PSRC 2009b), and in the 2007–2010 Transportation Improvement Program (TIP), which lists all current transportation projects (PSRC 2009a). The RTP and the TIP meet the conformity requirements identified by federal and state regulations for CO.

Environmental Justice

What indirect effects would the project likely have on low-income, minority, or limited English proficiency populations?

No direct or indirect effects were identified that would contribute to a cumulative effect on low-income, minority, or limited English proficiency (LEP) populations.

How would the project contribute to a cumulative effect on low-income, minority, or LEP populations?

Because no direct or indirect effects were identified, the project would not contribute to a cumulative effect on low-income, minority, or LEP populations for this project.

In reaching this conclusion, the analysts began by defining the study area for cumulative effects on low-income, minority, and LEP residents as the central Puget Sound region as presented in the *Transportation 2040 DEIS* (PSRC 2009b). Next,

the analysts reviewed technical memoranda and discipline reports prepared for the following disciplines: air quality; cultural resources; ecosystems; land use, economics, and relocations; noise; public services and utilities; social elements; transportation; and visual quality and aesthetics to identify potential direct and indirect effects of the Build Alternative that could contribute to a cumulative effect on low-income, minority, or LEP populations.

Analysts then identified other past, present, and reasonably foreseeable future actions that could contribute to a cumulative effect on low-income, minority, or LEP populations through 2030, the project design year. To identify these actions, analysts researched local and regional comprehensive, land use, and transportation plans, and reviewed the present and reasonably foreseeable future actions prepared by WSDOT to support the analyses in the Environmental Justice Technical Memorandum.

Geology and Soils

What indirect effects would the project likely have on geology and soils?

Indirect effects of project construction related to geology and soils would involve aggregate or granular soil use that would preclude their use for other projects and lead to the depletion of this resource in the project vicinity. Aggregate depletion is viewed as a minor indirect effect for this project. No indirect effects were identified for project operation.

How would the project contribute to a cumulative effect on geology and soils?

Construction of the Build Alternative would have a minor contribution to aggregate depletion in the area, in combination with the effects of past, present, and reasonably foreseeable future actions. By design, the project would have a beneficial effect with regard to seismic and soil stability.

Hazardous Materials

What indirect effects would the project likely have on hazardous materials?

Hazardous materials are not in and of themselves a resource that would be evaluated for cumulative effects. Hazardous materials, however, could affect resources including air and

water. Hazardous materials could be associated with contaminated soils and groundwater, building materials encountered through demolition, hazardous materials used at construction sites and released into the environment due to accidental spills, and underground storage tanks. Depending on the contamination, there could be risks to worker safety and public health in addition to the environmental damage.

However, the risk of encountering hazardous materials for this project is low and there are several safeguards in place to minimize temporary effects, including the WSDOT spill prevention control and countermeasures (SPCC) plan for construction projects. See Appendix J, Hazardous Materials Technical Memorandum, for additional information.

How would the project contribute to a cumulative effect on hazardous materials?

Because no direct or indirect effects were identified, no cumulative effects were identified for hazardous materials.

Cultural Resources

What indirect effects would the project likely have on cultural resources?

Traditional cultural properties and archaeological sites relating to Native American cultures have not been identified in the project footprint and are not expected to be directly or indirectly affected by the project. No known historically significant properties would be damaged, removed, or physically altered during project construction or operation. No indirect effects to cultural resources were identified for this project.

How would the project contribute to a cumulative effect on cultural resources?

WSDOT determined that the project would have no direct or indirect effect on any identified cultural resource. For this reason, WSDOT concluded that the project would not contribute to a cumulative effect on cultural resources (WSDOT et al. 2008).

Ecosystems

What indirect effects would the project likely have on ecosystems?

Project construction will directly affect wetlands, streams, and wildlife habitat, but all of these effects will be mitigated as part of the project and design. No indirect effects were identified.

How would the project contribute to a cumulative effect on ecosystems?

As discussed in Appendix L, Ecosystems Discipline Report, WSDOT has worked to avoid and minimize effects to ecosystems during the scoping and design of this project. WSDOT avoided many effects to resources through careful identification of sensitive areas early in the design process.

Where avoidance was not possible, effects were minimized by treating stormwater, providing wildlife habitat, and improving wetland functions. The project would make a beneficial contribution to ecosystem health along the SR 520 corridor, helping to reduce the cumulative effect of development on wetlands and aquatic habitat. Through best management practices, conservation measures, and the application of specific construction sequencing and timing (such as minimizing in-water work), WSDOT would ensure that short-term construction effects on wetlands, fisheries resources, and wildlife would be small and would not lead to substantial fish mortality, changes to fish populations or subpopulations, habitat loss or degradation, or decreased wetland function.

Considered with the effects of past, present, and reasonably foreseeable future actions, the project would have a negligible contribution to cumulative effects on wetlands, streams, and wildlife.

Energy

What indirect effects would the project likely have on energy?

The energy analysis did not identify indirect effects on energy or greenhouse gas (GHG) emissions from project construction or operation. Energy supplies are sufficient to build and operate the project without placing abnormal demands on energy sources outside the region.

How would the project contribute to a cumulative effect on energy?

The construction and operation of the project would consume energy and emit GHGs into the atmosphere. Operation of the project would not be measurably different from the No Build Alternative and thus would not contribute to a cumulative effect. Construction of the project would have temporary release of emissions. WSDOT has taken steps to minimize fuel use during construction to reduce GHG emissions by construction equipment by setting up construction areas, staging areas, and material transfer sites in ways that reduce equipment and vehicle idling.

Considered with the effects of past, present, and reasonably foreseeable future actions, the project would have a negligible contribution to cumulative effects on energy and climate change.

Global climate change is being addressed at local, regional, national, and international levels. In Washington State, the Legislature has set in law state GHG and vehicle miles travelled (VMT) reduction goals. Governor Christine Gregoire, by Executive Order 09-05, Washington's Leadership on Climate Change, created partnerships aimed at reducing transportation-related GHG emissions. WSDOT is active in the state-wide and regional efforts to reduce VMT and GHG emissions. These efforts will build on the many programs WSDOT has in place that reduce GHG and VMT including the following: Commute Trip Reduction Program, Growth and Transportation Efficiency Center Program, and Vanpool Investment Program (the largest program in the country – eliminated 203 million drive-alone miles statewide in 2008). The region's transportation plan prepared by PSRC contains a series of recommendations that address energy and GHGs.

Land Use, Economics, and Relocation

What indirect effects would the project likely have on land use, economics, and relocation?

The Build Alternative would not result in indirect land use effects after construction. The existing land uses in the project area are well established and generally consistent with the applicable comprehensive plan and zoning designations. In addition, regional land use planning decisions are established in adopted regional and local land use plans, and these plans considered transportation planning decisions and future transportation improvements.

The project would not result in any adverse indirect effects on the regional economy. Temporary, beneficial indirect economic effects would accrue from the hiring of vendors and purchasing of materials and supplies required for project construction, leading to increased employment throughout the relevant parts of the supply chain in the short-term.

How would the project contribute to a cumulative effect on land use, economics, and relocation?

The proposed project is part of the desired future as outlined in the PSRC's *Vision 2040* (PSRC 2008). The Build Alternative's contribution to the cumulative effect on land use would not be adverse or substantial in combination with other past, present, and reasonably foreseeable future actions. The Build Alternative's relative contribution (approximately 12 acres converted from existing land use to transportation right of way) would not be measurable compared to the total cumulative effect.

Regional land use decisions are determined at the regional level and are implemented in local comprehensive plans that must be consistent with *Vision 2040* (PSRC 2008). The *Transportation 2040 DEIS* (PSRC 2009b) land use analysis incorporates reasonably foreseeable changes in the Puget Sound's future land use, population, employment, and travel behavior, including the SR 520, Medina to SR 202: Eastside Transit and HOV Project, and subsequent development would be planned according to the development regulations of the local jurisdiction.

The project would not contribute to a cumulative effect on economic activity. This is because there is little expected

difference between the Build Alternative and No Build Alternatives in the 4-County area (King, Pierce, Snohomish, and Kitsap Counties) as measured to the end of the design life of the project in 2030.

Because the Build Alternative is not proposing tolling, it would have no contribution to the cumulative effects from tolling associated with reasonably foreseeable future actions.

Noise

What indirect effects would the project likely have on noise?

No indirect effects related to noise were identified. Once project construction is complete, most if not all of the direct effects would be reduced or eliminated. Because the traffic noise study uses future predicted traffic that includes other planned projects and commuting projections, the direct effects of the project, along with traffic noise from other area roadways, would likely be the dominant noise source in the corridor.

How would the project contribute to a cumulative effect on noise?

The Build Alternative will reduce noise adjacent to the roadway by constructing noise barriers and lids at several locations. While the Build Alternative is not expected to have a cumulative effect on the regional noise levels, the project will have measurable reductions of noise in the study area (500 feet to either side of the roadway). The total number of residences experiencing high noise levels (exceeding the NAC) would be reduced from 128 (under no action) to 20 under the proposed Build Alternative. Most of the remaining properties exceeding the NAC do so because of traffic noise radiating from arterial roads, such as Bellevue Way and Lake Washington Boulevard, 84th Avenue NE, 92nd Avenue NE and NE 28th Street.

Social Elements

What indirect effects would the project likely to have on social elements?

There are few social resources (that is, parks, libraries, churches, community centers, and schools) located in the study area. Operation of the project would have no direct effects on any of the social elements that would result in indirect effects. The project does have the potential to result in

positive indirect benefits related to air quality because of the reduced number of single-occupancy vehicles and the anticipated increases in transit, carpools, and vanpools. Additionally, the lids are intended to provide improved pedestrian and non-motorized access to both sides of SR 520, which could increase social cohesion in the neighborhoods bisected by the original roadway construction.

How would the project contribute to a cumulative effect on social elements?

No direct or indirect effects were identified that would contribute to cumulative effects for social elements. Several temporary adverse direct effects were identified related to construction. However, these do not contribute to a long-term cumulative effect. The analyst did identify beneficial effects, such as improved transit and HOV services, improved response time for emergency vehicles, and community connections via lids.

Because the Build Alternative is not proposing tolling, it would have no contribution to the cumulative effects from tolling associated with reasonably foreseeable future actions.

Transportation

What indirect effects would the project likely have on transportation?

No indirect effects related to transportation were identified. This project produces direct beneficial effects on transportation; no adverse indirect effects are anticipated.

How would the project contribute to a cumulative effect on transportation?

Construction activities would have a minor, short-term contribution to cumulative effects by causing travel delays and congestion due to lane and road closures and detours.

The project would have a beneficial effect, implementing regional planned transportation improvements and maintain or improve traffic conditions within the SR 520 corridor. Under the Build Alternative, in conjunction with other regional transportation projects, traffic conditions within the project corridor are expected to be similar to or better than those estimated for the project if other planned actions did not occur.

Increases in carpool and transit demand are projected under both the Build Alternative and No Build Alternative. This is largely due to improvements to the HOV lane system between Redmond and Seattle. However, the increase in HOV demand associated with the No Build Alternative would not be as large as with the Build Alternative.

Because the Build Alternative is not proposing tolling, it would have no contribution to the cumulative effects from tolling associated with reasonably foreseeable future actions.

Visual Quality and Aesthetics

What indirect effects would the project likely have on visual quality and aesthetics?

No indirect effects associated with visual quality were identified.

How would the project contribute to a cumulative effect on visual quality and aesthetics?

The Build Alternative will have a minor contribution to the visual effects of past, present, and reasonably foreseeable future actions. Construction and operation of SR 520 would change the visual character and reduce the visual quality rating of the SR 520 corridor from Medina to approximately I-405 because mature vegetation would be replaced with noise walls and the highway would likely be noticeably wider. These changes would result in the SR 520 corridor becoming more suburban in character and generally continuing the urbanization trend. WSDOT would establish architectural standards for noise walls and bridges, add landscaping, and revegetate disturbed areas.

Water Resources

What indirect effects would the project likely have on water resources?

There are no identified indirect effects to stormwater or surface water. There are no identified direct or indirect effects to groundwater in the study area. There would be no direct or indirect effects to water resources in the restriping portion of the project.

How would the project contribute to a cumulative effect on water resources?

The Build Alternative will contribute incremental benefits to water quality in relation to the effects of past, present, and future actions. Operation of the new SR 520 stormwater treatment facilities would reduce the amounts of pollutants (pounds per year) discharged to study area receiving waters as well as a reduction in the concentrations of pollutants discharged at any one time to the same receiving environments. An additional benefit would be habitat improvement associated with reductions in peak flows to streams. These are all beneficial cumulative effects that will be measurable within local streams but not likely to be measurable within the adjacent bays and Lake Washington.