Chapter 5 The Environment: Existing Conditions, Project Effects, and Mitigation

Chapter 5 describes the existing conditions, project effects, and proposed mitigation for the social, economic, transportation, and environmental resources along the SR 520 project corridor.

Transportation

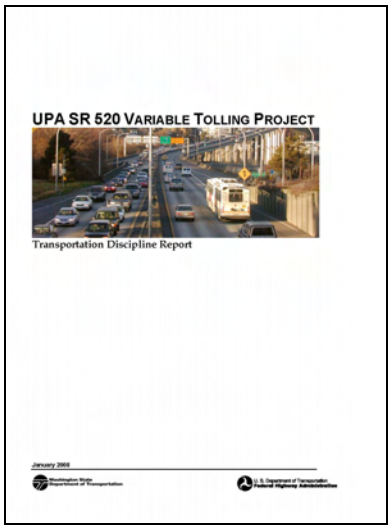
SR 520 connects Seattle on the west side of Lake Washington with Medina, Hunts Point, Yarrow Point, Clyde Hill, Kirkland, Bellevue, and Redmond on the east side of the lake and, therefore, serves as a critical connection for people crossing Lake Washington. Because SR 520 connects major communities in the state, WSDOT considers it a highway of statewide significance.

In addition, the transportation system around Lake Washington is a complex system of interconnected highway and freeway facilities. There are currently only three major roadways providing access between the east and west sides of Lake Washington: SR 520, I-90, and SR 522. These east-west corridors are connected by two major freeways running in the north-south direction: I-405 and I-5, east and west of Lake Washington.

This project will implement a multi-lane tolling system on the existing Evergreen Point Bridge, which is described in Chapter 4. We analyzed different tolling strategies and prices to determine the effects on traffic in the region. A detailed explanation of this analysis can be found in the *Transportation Discipline Report* located in Appendix E. Below is a summary of our transportation effects analysis.

How will the project affect traffic?

Methods and Analysis



We analyzed SR 520 and other major roadways in the area (I-405, I-5, I-90, and SR 522) to understand how the SR 520 Variable Tolling Project would affect future travel demand and operational performance on these roadways. We looked at 2010, which is when this project will begin, and 2016, the date currently planned for completion of a new six-lane Evergreen Point Bridge.

Because the proposed tolling will be all electronic, there will be no traffic disruptions such as those created by toll plazas. Therefore, the effects of the tolling within the project area relate to the change in the 'cost' of the route rather than to physical changes, such as a toll plaza. Since the toll rates have not been established, we analyzed these effects assuming both a low and a high price for the toll to understand the range of potential effects. The low and high toll scenarios are described in Chapter 4 of this document.

Projected future regional population and employment growth in the region will increase travel demand compared to existing conditions. We analyzed these future changes in travel patterns using the Puget Sound Regional Council's Transportation Planning Model (a regional travel demand model), which includes King, Pierce, Snohomish, and Kitsap counties. We used this model to forecast the future traffic volumes for 2010 and 2016 and to determine the traffic diversion from SR 520 onto other cross-lake routes, such as I-90 and SR 522, when the Evergreen Point Bridge is tolled.

This regional model is a very good tool for comparing the relative effects on travel choices resulting from the different toll scenarios and alternatives at a regional level. However, this model is not detailed enough for predicting what might occur at a particular interchange or local intersection. The model runs we used for our analysis allow us to make relative observations about

potential changes in travel patterns using the major highways in the network.

Total Cross-Lake Travel Volumes

Currently, all routes that cross or go around Lake Washington operate poorly during peak periods due to congestion; these routes include SR 520, I-90, and SR 522. Once the tolls are in place on SR 520, we estimate the reductions in the total number of cross-lake trips on all routes combined (as compared with the no toll scenario or No Build Alternative) will be:

- **2010 Low Toll Scenario:** 3 percent for the morning peak and 4 percent for the afternoon peak.
- **2010 High Toll Scenario:** 5 percent for both morning and afternoon peaks.
- **2016 Low Toll Scenario:** 3 percent for the morning peak and 4 percent for the afternoon peak.
- **2016 High Toll Scenario:** 3 percent for the morning peak and about 4 percent for the afternoon peak.

What are peak period volumes?

For this analysis, when we refer to peak period volumes we are talking about peak period bi-directional volumes. These are the sum of the a.m. and p.m. hourly volumes throughout the duration of the peak (6 a.m. to 9 a.m. in the morning and 3:00 p.m. to 6:00 p.m. in the afternoon) in both directions of travel.

This reduction in cross-lake traffic during the peak periods can be attributed either to people deciding to change the time of day of their trip (to avoid peak hours and the consequent higher tolls and congestion), to people changing their mode of travel from private vehicles to transit, or to people deciding not to make the cross-lake trip altogether.

Additionally, a system-wide analysis performed as part of the Tolling Implementation Committee *Tolling Report Prepared for the Washington State Legislature,* January 28, 2009 showed that the regional transportation network, (that is, beyond the limits of our study area) is relatively unaffected by the proposed tolling on SR 520.

Traffic on SR 520

The reduction in total cross-lake traffic can be attributed to the relatively large reduction in peak period volumes

specifically on SR 520 when compared with the No Build Alternative. We expect the reduction in peak period volumes on SR 520 due to people choosing other routes, changing to transit, or deciding not to make the trip across the lake will be:

- **2010 Low Toll Scenario:** 11 percent for the morning peak and 14 percent for the afternoon peak.
- **2010 High Toll Scenario:** 18 percent for the morning peak and about 17 percent for the afternoon peak.
- **2016 Low Toll Scenario:** 11 percent for the morning peak and about 12 percent for the afternoon peak.
- **2016 High Toll Scenario:** 14 percent for the morning peak and 13 percent for the afternoon peak.

This reduction in traffic will ease some of the increasing congestion expected on SR 520 by 2010 and 2016 compared to the No Build Alternative.

The results from the Puget Sound Regional Council model runs indicate that SR 520 will benefit—in terms of operational performance—from the tolling implementation as well. The reduction in traffic on this route will in turn yield better speeds and travel times. See Exhibit 5-1 for 2010 and Exhibit 5-2 for 2016.

Exhibit 5-1
Year 2010 Speeds and Travel Times

		Speeds Percentage Difference with No Build Alternative		Travel Times Percentage Difference with No Build Alternative	
		AM	**PM**	**AM**	**PM**
SR 520	Low Toll	18%	38%	-14%	-25%
	High Toll	17%	38%	-13%	-25%

Exhibit 5-2
Year 2016 Speeds and Travel Times

		Speeds Percentage Difference with No Build Alternative		Travel Times Percentage Difference with No Build Alternative	
		AM	**PM**	**AM**	**PM**
SR 520	Low Toll	18%	45%	-14%	-28%
	High Toll	18%	45%	-14%	-28%

Because traffic volumes will be reduced, we expect travel speeds to improve on SR 520 from 5 mph to 15 mph, depending on the peak period for both 2010 and 2016. This increase in average speed results in shortened travel times along the corridor by as much as 28 percent during the 2016 evening peak period.

The smaller differences in performance measures such as speeds and travel times observed between the low and high toll scenarios are likely due to the smaller difference between the high and low toll scenarios compared to the no toll (No Build) and low toll scenario. There is a 100 percent increase in cost from the no toll to the low toll scenario, whereas from the low to the high toll scenario the increase in cost is only 29 percent.

Traffic on Alternative Routes

As previously stated, the total cross-lake traffic is likely to decrease between three percent and five percent depending on the peak period. Therefore, the alternative routes (SR 522 and I-90) would only see a small increase in traffic in comparison with the No Build Alternative. For SR 522—and depending on the peak period and the tolling alternative—this increase will vary between one percent and three percent in 2010 and between one percent and four percent in 2016. For I-90—and also depending on the peak period and tolling alternative being considered—the traffic growth due to diversion

will range between one percent and three percent in 2010 and zero percent to three percent in 2016.

These small differences mean that levels of congestion on SR 522 and I-90 would be very similar to those which exist today.

How will the project affect safety?

WSDOT performed a safety analysis for the SR 520 corridor that looked at accident records between 2000 and 2002. WSDOT identified the following four locations along the corridor as high-accident locations during the three- year study period (Exhibit 5-3):

- SR 520 mainline near the I-5 interchange between mileposts 0.00 and 0.31.
- SR 520/Montlake Boulevard interchange westbound on-ramp between mileposts 0.00 and 0.22.
- SR 520/Montlake Boulevard interchange eastbound on-ramp between mileposts 0.0 and 0.42.
- SR 520/Lake Washington Boulevard westbound off-ramp between mileposts 0.07 and 0.27.

Exhibit 5-3
High Accident Locations on SR 520

The exposure to accident risk on a roadway is directly proportional to the average daily traffic. Because we expect a reduction in average daily traffic on SR 520 after tolling is implemented, the average exposure to accident risk on SR 520 will also be reduced. Thus, we expect the project to increase safety along SR 520.

The amount of additional traffic using SR 522 or I-90 after a toll is implemented will be small in relative (percent) terms. Therefore, we do not expect an increase in the exposure to accident risk on the other major roadways surrounding the lake beyond the natural increase that the no toll scenario (No Build Alternative) may produce by 2010 and 2016.

How will project construction affect traffic?

Motorists traveling along SR 520 will experience some disruptions and inconvenience. Construction will require temporary lane reductions or closures. WSDOT and its contractor will work together to ensure the maximum access through and around the project during construction. Lane closures will typically be restricted to nighttime hours.

These disruptions and inconveniences are minimized because much of the project will be constructed away from the roadway, off of the eastbound SR520 shoulder. Most, if not all, construction equipment will operate from the shoulder, and will not require lane closures.

Lane closures will be required in order to mount equipment above each lane. This work will occur during nighttime hours. Further closures may be required to adjust equipment during testing.

The amount of construction truck traffic will be minimal due to the limited extent of construction. Construction traffic will access most work areas from eastbound SR 520. Some vehicles will use westbound SR 520, as well as the Montlake Blvd. interchange and 108th Ave NE interchange in order to turn around.

How will construction effects on traffic be reduced?

WSDOT and its contractor will work together on the construction timing and sequencing to ensure the maximum access through and around the project area during construction. Some construction may be timed to avoid, as much as possible, the primary business hours at certain locations and special events. WSDOT will meet with individual businesses, local cities, and King County, as needed, to develop a plan that minimizes construction disruptions. The contractor will develop a traffic control plan that conforms to the established standards in the *Manual of Uniform Traffic Control Devices, Part VI* as well as any hour and/or date restrictions stipulated by WSDOT.

Social Resources

How many people are in the area and how is the area expected to grow?

According to the U.S. Census Bureau, the City of Seattle grew 9.1 percent from 516,259 in 1990 to 563,376 in 2000, while the City of Bellevue grew 26.1 percent (from 86,874 to 109,827). Together, Seattle and Bellevue comprise 37.2 percent of King County's total population. Exhibit 5-4 shows recent (2000 to 2007) population statistics for major cities and smaller municipalities that will be affected by the project.

According to forecasts prepared by the PSRC, King County is expected to grow by 38.2 percent between 2000 and 2040. An overview of the Puget Sound Regional Council's population forecasts for the major municipalities of Seattle, Bellevue,

Exhibit 5-4
Population Characteristics

	2000**	2007**	Percent Change 2000 to 2007
Bellevue	109,827	118,100	7.5%
Kirkland	45,054	47,890	6.3%
Redmond	45,256	50,680	12.0%
Seattle	563,376	586,200	4.1%
Clyde Hill	2,890	2,810	-2.8%
Hunts Point	443	480	8.4%
Medina	3,011	2,950	-2.0%
Yarrow Point	1,008	975	-3.3%
King County	1,737,034	1,864,300	7.3%
Puget Sound Region	3,275,857	3,582,900	9.4%

Source: U.S. Census Bureau, Puget Sound Regional Council

**Figures from 2000 are actual numbers from the Decennial Census, while figures from 2007 are estimated by the U.S. Census Bureau.

Kirkland, and Redmond, as well as King County, are provided in Exhibit 5-5.

Exhibit 5-5
Population Forecasts for Major Cities

	2000	2010	2030	2040
Bellevue FAZ**	104,003	111,004	137,692	149,219
Kirkland FAZ	44,009	47,758	54,848	56,809
Redmond FAZ	71,726	90,352	104,721	112,507
Seattle FAZ	563,313	586,365	672,441	718,651
King County FAZ	1,737,034	1,892,999	2,234,775	2,401,521

Source: Puget Sound Regional Council: Sub-County Forecasts, Amended 2007

**FAZ = Forecast Analysis Zone, which do not necessarily correspond to municipal boundaries.

What effects will the project have on social resources?

Due, in part, to the large amount of growth described above, congestion along SR 520 is expected to increase. The implementation of variable tolling on SR 520, compared to the No Build Alternative, will reduce traffic congestion during peak hours, thus improving travel reliability and reducing travel times. However, tolling on SR 520 will likely divert a small percentage of the traffic to nearby travel routes; most of this traffic will be redirected to I-90, I-405, and SR 522. We do not expect these small increases from diverted traffic to affect community cohesion. Further, the project will not construct any walls, separations, or barriers that would divide or separate communities.

What are public services and where do they exist in the project area?

Public services include fire and police protection, schools, and emergency services. Exhibit 5-6 shows the locations of public services in and around the project area.

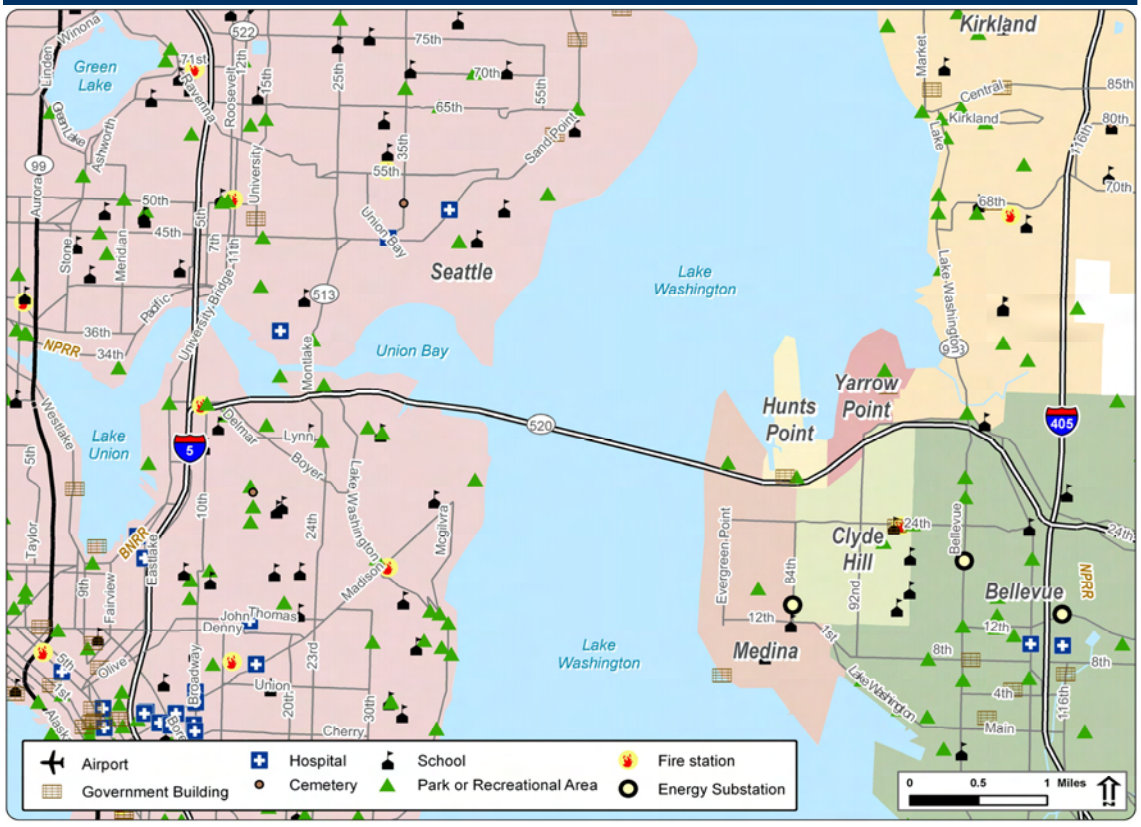
Seattle Fire Station #22

What effects will the project have on public services?

Increased mobility, increased reliability, and decreased travel times along SR 520 will benefit emergency service

providers who use the roadway as an emergency service route and improve access to any public service facilities located along SR 520. Conversely, a slight decrease in mobility along routes that will accommodate diversion traffic could affect emergency services by slightly increasing response times. We expect this effect on emergency response times to be minor. Public service providers will need to pay a toll to use the Evergreen Point Bridge; however, in the case of emergencies, the toll is refunded to the provider.

Exhibit 5-6
Public Services



How will construction effects on public services be minimized?

WSDOT will coordinate in advance with emergency services, law enforcement, public service providers, and schools regarding planned detours and delays. WSDOT

will fully explain the project and familiarize them with the construction traffic plan that will be used. Additionally, WSDOT will regularly update project websites that report construction activities and the main SR 520 project website to provide information regarding construction activities and how drivers, residents, and businesses will be affected. WSDOT will require that road closures and detours are prominently signed and also widely distribute notice of changes to media covering the project area. WSDOT will coordinate with local emergency responders to ensure priority access for emergency and law enforcement vehicles.

What recreational areas are located near the project area?

Of the parks located immediately adjacent to SR 520, six are located in Seattle and four on the eastside of Lake Washington. Exhibit 5-7 lists these parks and recreational facilities located along SR 520.

Exhibit 5-7
Parks and Recreational Facilities Along SR 520

Washington Park Arboretum	Seattle
Bagley Viewpoint	Seattle
Interlaken Park	Seattle
East Montlake Park	Seattle
Montlake Community Center and Playfield	Seattle
McCurdy Park	Seattle
Hunts Point Park (D. K. McDonald Park)	Hunts Point
Fairweather Park	Medina
Wetherill Nature Preserve	Hunts Point and Yarrow Point
Yarrow Bay Wetlands	Kirkland

Three trails fall within the project area: the Bill Dawson Trail (Montlake Bike Path) heads north from the Montlake Playfield in Montlake Park and travels underneath SR 520; the Arboretum Waterfront Trail starts in the north part of Washington Park Arboretum, crosses underneath SR 520, then heads west to East Montlake Park; and the Points Loop

Wetherill Nature Preserve in Hunts Point.

Trail is east of Lake Washington, adjacent to SR 520 on the north.

Will the project affect any recreational areas?

The SR 520 Variable Tolling Project will not have any effect on parks or recreational facilities.

Environmental Justice

Why is it important to consider Environmental Justice during planning?

Environmental Justice acknowledges that the quality of our environment affects our lives, and negative environmental effects should not disproportionately burden low-income or minority communities.

Negative environmental effects associated with transportation projects may include, among others: limited access to a publicly-funded facility, disruptions in community cohesion, presence of hazardous materials, raised noise levels, or increased air or water pollution.

What studies did we complete for this analysis?

We used four approaches to collect data on low-income and minority populations:

- Demographic analysis
- Surveys of Evergreen Point Bridge users
- Focus groups and telephone interviews with Evergreen Point Bridge users
- Public involvement activities

We also collected data on limited-English proficient populations to ensure that our outreach efforts take into account the potential need for translation. Based on the results of our data collection, surveys were translated

What federal orders and policies guide Environmental Justice?

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations in 1994 was issued to reinforce the importance of fundamental rights and legal requirements contained in Title VI of the Civil Rights Act of 1964, as amended, and NEPA.

Each federal agency issued implementing orders. The USDOT (USDOT Order 5610.2) and FHWA (FHWA 6640.23) orders require federal agencies to explicitly consider human health and environmental effects related to transportation projects that may have a disproportionately high and adverse effect on minority or low-income populations.

Executive Order 13166 compels agencies to evaluate the effects of projects on people with limited-English proficiency (LEP), in order to avoid discrimination on the basis of national origin.

Other federal laws, such as the National Environmental Policy Act (NEPA), Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended, the Civil Rights Restoration Act of 1987, and the Transportation Equity Act (TEA-21) also include the nondiscrimination requirements outlined in Title VI.

into Spanish. For more information on how we collected information on bridge users, see Appendix D of this EA.

Why is public involvement important?

Public involvement is important so all the public, especially low-income or minority populations potentially affected by a project, have meaningful opportunities for involvement during project planning and development. Public involvement helps identify project impacts as early as possible so that they can be avoided and/or mitigated. Public involvement can include neighborhood meetings, open houses, and booths at community festivals.

What neighborhoods may be affected by the project?

Neighborhoods that have the potential to be affected by the project include:

- Neighborhoods from which traffic on the Evergreen Point Bridge originates.
- Neighborhoods surrounding the Evergreen Point Bridge.
- Neighborhoods surrounding untolled alternate routes that may be used by drivers who want to avoid paying the toll on the Evergreen Point Bridge. These include neighborhoods surrounding SR 522 north of Lake Washington and the I-90 Bridge.

Neighborhoods from which traffic on the Evergreen Point Bridge originates

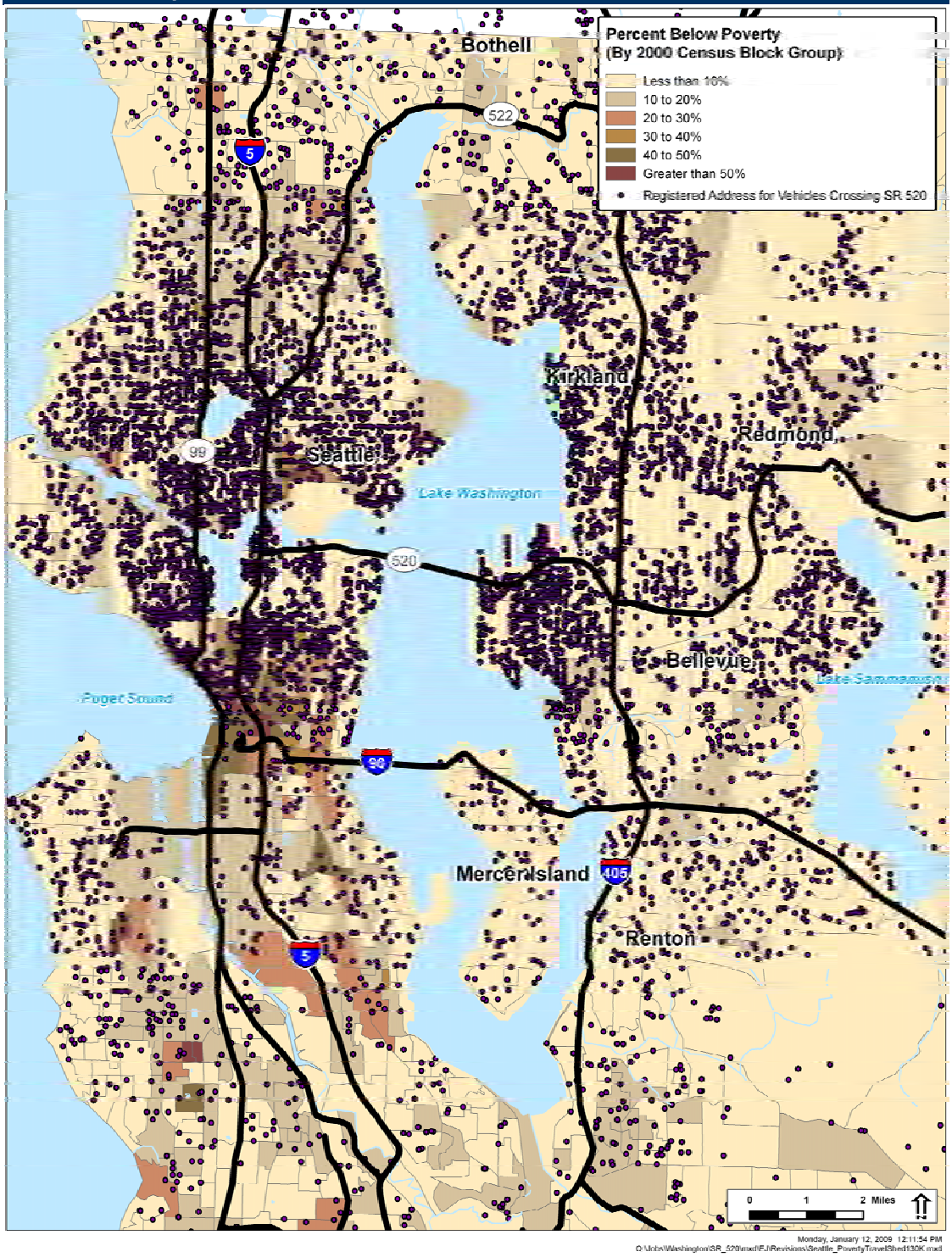
The tolling of the existing Evergreen Point Bridge will affect users of the facility as much as it will affect people living and working near the facility. To identify Evergreen Point Bridge users, we examined the communities from which trips on the Evergreen Point Bridge originate. Residents within the SR 520 travelshed are comprised of low-income and/or minority populations, and non-low-income and/or non-minority populations (see Exhibit 5-8).

What is a Travelshed?

A travelshed refers to the geographic area from which traffic on a given facility originates.

Our demographic analysis indicates that 8.8 percent of households in the SR 520 travelshed have incomes below the federal poverty level and 28 percent are minority, according to the 2000 U.S. Census. Based on this information, it is probable that at least some of these households use the Evergreen Point Bridge.

Exhibit 5-8
Low-income Populations in Travelshed



In our telephone survey of Evergreen Point Bridge users, we spoke with 318 low-income and/or minority respondents. Seventy-one of the 318 respondents had household incomes below the federal poverty level. In our intercept survey of transit users on the Evergreen Point Bridge, 107 of the 442 respondents were low-income and/or minority. Twelve of those 107 had household incomes below the federal poverty level.

Neighborhoods surrounding the Evergreen Point Bridge

There are low-income and minority populations living in the neighborhoods surrounding the Evergreen Point Bridge. We made this determination after reviewing the demographic analysis completed for the Environmental Justice analysis for the SR 520 Bridge Replacement and HOV Project Draft EIS. For this analysis, the Environmental Justice study area was defined as the polygon created on an area map by applying a one-mile buffer around these two sections of highway:

- SR 520 from the I-5 interchange in Seattle east to the 124th Avenue NE interchange in Bellevue.
- I-5 from the SR 520 interchange south to the Boylston Avenue East on-ramp to I-5.

While most of the census block groups in this study area have low concentrations of low-income and minority populations, there are relatively high concentrations of low-income populations in a few census block groups in the University District and in the South Lake Union neighborhoods in Seattle. There are also relatively high concentrations of minority populations in the Crossroads neighborhood in Bellevue.

Neighborhoods surrounding untolled alternate routes

Because one potential effect of tolling the Evergreen Point Bridge is that traffic may increase on untolled

routes (such as I-90 or SR 522), it is important to examine the communities surrounding non-tolled alternate routes.

According to our demographic analysis of census block groups in neighborhoods surrounding the SR 522 corridor, nearly 10 percent of residents had household incomes below the federal poverty level. The percentage of residents in each block group with household incomes below the federal poverty level ranged from 2 percent to 31 percent. Twenty-three percent of residents were minority and 5 percent were Hispanic. The percentage of residents in each block group who were minority ranged from 10 percent to 57 percent, and the percentage of residents who were Hispanic ranged from 1 percent to nearly 15 percent.

The term Hispanic is used by the U.S. Census Bureau for anyone who is of Hispanic origin, regardless of race.

There are also low-income and minority populations living in the neighborhoods surrounding I-90 between I-5 and I-405. The majority of these populations are concentrated in the neighborhoods at the western end of the I-90 Bridge. According to our demographic analysis of census block groups occurring by the I-90 Bridge, nearly 15 percent of residents had household incomes below the federal poverty level in 2000. The percentage of residents in each block group with household incomes below the federal poverty level ranged from 0 percent to 49 percent. Nearly 42 percent of residents were minority and nearly 6 percent were Hispanic. The percentage of residents in each block group who were minority ranged from 4 percent to 78 percent, and the percentage of residents who were Hispanic ranged from 1 percent to nearly 25 percent.

The U.S. Census Bureau provides statistics on minority and poverty status for block groups in the study area. However, because the data is almost ten years old (data for the 2000 Census was collected in 1999), data from the National Center for Education Statistics (NCES) further confirmed the presence of minority and low-income populations. NCES collects demographic data on students enrolled in school during the 2006-2007 academic year.

What are the potential effects of the project?

There are two ways in which project operation will benefit all users, including low-income and minority populations, compared to the No Build Alternative:

- People who drive across the Evergreen Point Bridge will benefit from improved speeds for all vehicles and trip reliability as a result of fewer cars on the bridge.

- With fewer cars on the Evergreen Point Bridge, transit riders, including low-income and minority riders, will benefit from improved transit speeds and reliability.

There are three ways in which the project will adversely affect low-income, minority or limited-English proficient populations compared to the No Build Alternative, if not mitigated:

- The cost of the tolls will present a burden to low-income bridge users.
- The cost of the tolls will present a burden to social service agencies that serve low-income populations.
- Bridge users may choose to purchase a transponder and set up an account with WSDOT to pay the toll, or have their license plate automatically photographed and receive by mail a bill for the toll with a surcharge added. Both options will present a burden to low-income and limited-English proficient Evergreen Point Bridge users.

FHWA directs WSDOT to apply two criteria to determine whether an effect is disproportionately high and adverse:

- Low-income and/or minority populations will predominately bear the effects.
- Low-income and/or minority populations will suffer the effects and the effects will be considerably more severe or greater in magnitude than the adverse effects suffered by the general population.

We determined that low-income and minority populations will not predominately bear the effects of this project. The toll will be charged to all bridge users and all bridge users may choose to purchase transponders or receive by mail a bill for the toll with a surcharge added. Even though it is not possible to determine exactly what proportion of bridge users are low-income, by looking at the travelshed map overlaid with U.S. Census data earlier in this section, it does not

appear that there are more bridge users coming from census block groups with higher proportions of low-income residents than other census block groups.

However, we did determine that the tolls on the Evergreen Point Bridge will be appreciably more severe for low-income users because they will have to spend a higher proportion of their income on the toll.

Previous analyses of tolling equity for several other projects have concluded the effect would not be disproportionately high and adverse for the following reasons:

- The benefits of improvements to trip reliability and speeds will offset the burden of the tolls.
- There are viable options to avoiding the toll. Furthermore, because low-income populations tend to use transit at a higher rate than the general population, improvements in transit speeds and reliability will offset the burden of the tolls.

While it is important to note that many low-income populations will benefit greatly from a faster, more reliable trip, Environmental Justice principles state that to offset a disproportionate adverse effect to low-income populations, the benefit also needs to disproportionately affect low-income populations. In this case, the benefits of a faster, more reliable trip apply to all people and not just low-income populations.

Although there are options for avoiding the toll, they may not be viable for many low-income bridge users. Based on the results of surveys, focus groups, and one-on-one interviews with low-income Evergreen Point Bridge users, it appears that transit is not a viable alternative to paying the toll for most low-income populations because service is infrequent, unreliable, requires several transfers, or takes too much time. Furthermore, although some national and regional studies suggest that low-income populations use transit

at a higher rate than the general population, results from our transit intercept survey suggest that transit routes on the Evergreen Point Bridge do not serve low-income populations at a higher rate than the general population.

In addition, although many survey respondents indicated that they would use un-tolled routes as an alternative to paying the toll, these routes will add substantial time, distance, and cost to the trip. The system could also limit access to the Evergreen Point Bridge for limited-English proficient populations, who may also have difficulty understanding how to purchase a transponder and set up an account.

A small amount of traffic currently crossing the Evergreen Point Bridge would use SR 522 north of Lake Washington or the I-90 Bridge instead of paying the toll on SR 520 (as documented in the Transportation Discipline Report for this project). Although there are low-income and minority populations living in the neighborhoods surrounding SR 522 and the I-90 Bridge, there should be no adverse effects on the low-income and minority populations living in these neighborhoods because there will not be a substantial amount of traffic diverting to SR 522 or I-90.

We do not anticipate that this project will have disproportionately high and adverse effects on minority populations. If reasonable mitigation strategies, such as those proposed later in this section are adopted, they will minimize disproportionately high and adverse effects on low-income and limited-English proficient populations.

What can be done to avoid or minimize adverse effects to low-income or minority populations?

If the SR 520 Variable Tolling Project is undertaken, WSDOT has already decided to employ these five strategies to help minimize adverse effects on low-income or limited-English proficient populations:

1. **Permanent customer service center storefronts:** WSDOT will establish permanent customer service center storefronts at either end of the Evergreen Point Bridge. Both locations will be transit accessible. Drivers will be able to purchase Good To Go!™ transponders and establish prepaid accounts with cash at these centers.

2. **EBT cards can be used to establish and replenish *Good To Go!*™ accounts:** Low-income Evergreen Point Bridge users will be able to establish and replenish their prepaid accounts using their Electronic Benefit Transfer (EBT) card. EBT functions like a debit card and allows recipients who receive federal benefits to pay for products and services, such as groceries and health care.

3. **Transponder retail outlets:** WSDOT will explore the possibility of establishing permanent *Good To Go!*™ retail outlets at convenient locations, such as grocery stores, convenience stores, or pharmacies throughout the region. Low-income focus group participants and Spanish-speaking interview participants indicated that this will make it much easier for them to purchase transponders and set up prepaid accounts with WSDOT.

4. **Multi-language outreach:** WSDOT will conduct outreach in multiple languages to provide information about how to purchase a transponder, establish an account, and use the system. Target languages will be the same languages that the Washington Department of Licensing uses for its translation: Chinese, Korean, Japanese, Russian, Spanish, and Vietnamese. WSDOT will also use pictograms whenever possible to explain the system. WSDOT will distribute information about the new tolling system and transponders throughout the region via community-based organizations, social service offices, churches, and schools; purchase

advertising in ethnic newspapers and radio stations; and establish hotlines with multi-lingual customer service agents well in advance of tolling.

5. **Training of social service workers:** WSDOT will provide social service agencies with information about tolling and options to avoid the tolls. This will assist social service workers in sharing accurate information with clients.

In addition, the following strategies could be considered for minimizing the effects of tolling on low-income populations. Some options may require legislative action, coordination with other agencies, or commitment of additional funding other than tolling revenue.

1. **Targeted transit improvements:** The Washington State Legislature could consider allocating additional funding to King County Metro Transit and Sound Transit to increase service along SR 520 routes that are used by low-income populations, especially in the University District and Crossroads in Bellevue. These routes could be identified by overlaying the travelshed map with King County Metro and Sound Transit route maps. Service could also be increased between low-income residential neighborhoods and job/education centers.
2. **Refunds to social service agencies:** The Washington State Legislature could allocate funding to provide refunds to social service agencies that broker transportation for low-income populations that meet certain thresholds.

For further discussion on mitigation, see Appendix D.

How will project construction affect low-income or minority populations?

No adverse construction effects are anticipated to disproportionately affect low-income or minority populations.

Economic Resources

What is the existing and projected employment in the area?

The Puget Sound Regional Council, which is the designated regional planning agency for the greater Seattle region that includes King, Kitsap, Pierce, and Snohomish Counties, releases yearly employment information by jurisdiction based on Washington State Employment Security Department data. Exhibit 5-9 displays employment information for 2007 for each jurisdiction surrounding the Evergreen Point Bridge, as well as King County and the Puget Sound Regional Planning Area.

As shown in Exhibit 5-9, Seattle has the largest population and employment numbers of any city in the region. Bellevue is second in these categories. This demonstrates the importance of an efficient transportation connection between the two cities.

What businesses located in the area surrounding the Evergreen Point Bridge may be affected?

Some types of businesses, including manufacturing and wholesale trade, transportation, and utilities, rely on their location adjacent to major transportation corridors to reduce transportation costs and maintain a competitive advantage. Also, some commercial businesses rely on locations near heavily traveled corridors to capture a large portion of their clientele. These businesses include gas stations, convenience stores, and hotels that are located adjacent to SR 520.

Regionally, the major employment centers of the University of Washington, downtown Seattle, downtown Bellevue, and the Overlake area of Redmond (Microsoft) have large numbers of employees that commute along the SR 520 corridor.

Exhibit 5-9
Population and Employment by Jurisdiction, 2007

How will the proposed project affect current and future employment trends?

Construction, operation, and maintenance of the toll facility on SR 520 will have no effect on employment trends in the region.

How will the project affect local and regional businesses that rely on SR 520?

Businesses located near the SR 520 corridor and the potential diversion routes are unlikely to see changes in revenues. Few consumers are likely to alter their transportation patterns enough to affect sales at local businesses.

Businesses that use SR 520 to deliver goods and services around the region would experience higher transportation costs due to the toll, compared to the No Build Alternative. However, these businesses would also benefit from improved trip reliability across SR 520 and a corresponding increase in productivity as a result of the project. This benefit would generally offset the higher transportation costs.

How will tolling affect local tax revenues?

Changes to sales and use tax revenues are unlikely, and overall spending habits are unlikely to change as a result of implementation of the project.

An improved transportation system and improved accessibility can help attract some business and residential development, which would increase tax revenues for affected jurisdictions. However, any improvement in congestion due to this project will likely have a negligible effect on development decisions, and therefore not have any noticeable effect on local tax revenues.

What will be done to avoid or minimize negative effects on economic conditions?

We expect no negative economic effects as a result of implementing variable tolling on the Evergreen Point Bridge. Therefore, no mitigation measures are proposed.

Surface Water, Water Quality, and Floodplains

What surface waters were analyzed?

For water resources, the analysis focuses on the eastern shore of Lake Washington, which is the only surface water body potentially affected since construction activity will be limited to this area.

What is the quality of the water in Lake Washington?

Lake Washington, at over 21,000 acres, is the largest lake in King County and the dominant water feature within the project area. The lake, long and narrow because of its glacial origins, has a drainage basin of approximately 470 square miles, much of which is residential. The lake drains into the Puget Sound via the Ship Canal.

Water quality in the lake is good for fish, wildlife, and recreational human use, but the lake is on the Washington State Department of Ecology 303(d) list for fecal coliforms (Ecology 2004). Pollutant sources for Lake Washington are typical of water bodies in urbanized areas and include runoff from commercial, industrial, and residential land uses.

What effects will the project have to surface waters, water quality, and floodplains?

The SR 520 Variable Tolling Project has relatively little ground-disturbing activity and construction needs, so localized water quality effects will be minimal compared to the No Build Alternative.

There will be very slight increases in impervious surface due to the installation of the concrete pad for the utility cabinets; however, because of the small size of the concrete pads, there will be no appreciable effect to stormwater runoff or water quality in the project area.

No construction would occur within existing floodplains; therefore, no effect will occur to floodplains.

What is groundwater and how is it affected?

Groundwater is water held underground in soil or permeable rock, often feeding springs and wells. The project will have no effect to groundwater.

What is the 303(d) list?

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

What are fecal coliforms? Fecal coliforms are bacteria present in human and animal feces. These bacteria can indicate the potential presence of harmful bacteria and viruses.

Why does impervious surface matter?

Impervious surface, such as concrete or pavement, can collect and concentrate stormwater runoff, as well as eliminate recharge areas for aquifers.

What measures are proposed to avoid or minimize effects to water resources during construction?

We will incorporate several measures into construction plans and specifications to reduce effects to water resources. These include:

- A Temporary Erosion and Sedimentation Control Plan will be prepared and implemented during construction. This plan will identify the best management practices (BMPs) that WSDOT and the contractor will use to control stormwater runoff and minimize sediment transport to Lake Washington.
- A Spill Prevention, Control, and Countermeasures Plan will be prepared according to WSDOT standards and implemented by the contractor during project construction. This plan details containment and cleanup procedures in the event of a spill of fuel or other chemicals during project construction. Effective implementation of this plan will greatly reduce the potential for release of toxic materials during construction.

Best Management Practices

Best management practices (BMPs), in terms of roadway construction water quality, refer to structural and nonstructural controls to minimize erosion and pollution. BMPs can include sediment basins, street sweeping, erosion control blankets, and seeding and/or mulching.

By implementing these measures, WSDOT will avoid or minimize construction effects to project area waters, as well as the fish and wildlife that occur in or use these waters.

Ecosystems—Wetlands, Wildlife, Aquatic Habitat

What is the local ecosystem like in the project area?

Lake Washington, including the shoreline area, is the part of the local ecosystem that could be affected by the project. Fish populations using the lake include the Endangered Species Act (ESA)-listed Chinook salmon, bull trout, and steelhead. The Lake Washington shorelines are developed with residential structures and uses along most of the shoreline length. Most of the

shoreline length has been armored to protect upland areas from erosion and this development has led to the loss of shoreline vegetation. However, numerous roost and nesting trees remain near the shorelines and are used by migratory songbirds and raptors including bald eagles.

How will this project affect the local ecosystem?

New power lines, power boxes, and monitoring equipment will run along the existing right-of-way or will hang from existing structures. Because these components will be installed in areas currently disturbed by roadway and other structures, permanent effects to the local ecosystem from their installation and operation are unlikely. Temporary effects will be limited to erosion and sedimentation resulting from soil disturbance and to disturbance resulting from construction noise compared to the No Build Alternative. These temporary effects can be minimized or avoided through the use of BMPs and timing restrictions.

Gantries with transponder readers and video cameras will create a new 24-hour light source over the water compared to the No Build Alternative. The video cameras require low-level lighting to detect the license plates of passing vehicles. Lighting from the video cameras is activated by passing vehicles and is at a low intensity to avoid startling or distracting drivers. The project will place the new lights on the Evergreen Point Bridge over deepwater habitat in a location near a sockeye salmon spawning area on the eastern shoreline of Lake Washington. Studies have shown that artificial lighting can promote early emergence from eggs and increased activity among newly hatched fish. Artificial lighting also affects predator-prey interactions among fish. Further discussion of effects caused by lighting systems on fish populations is discussed in *Ecosystems Technical Memo*, Appendix F.

Although fish and wildlife respond to lighting, there is already highway lighting on this portion of the bridge. In addition, the low-intensity video camera lights will be coincident with the higher intensity lights of passing vehicles. The effect of the new lighting will be indistinguishable from these existing light sources. Furthermore, the video camera lights will be directed toward the road deck resulting in minimal additional light reaching the surrounding environment. As a result, the new lighting installed by the project will have no effect on fish and wildlife.

The upper surface of a gantry may provide roosting or resting opportunities for birds. Seagulls (Western and glaucous-winged), Canada geese, swallows, and pigeons are known to use the Evergreen Point Bridge for resting or roosting, and large raptors (bald eagles and osprey) occasionally land on the structure. Since the gantry will provide only limited areas of flat surface, and those areas will be exposed to wind and rain, bird use is likely to be limited to short-term roosting and resting.

There are no wetlands in the area where project construction will take place; therefore, the project will not affect any wetlands.

How will construction affect vegetation, wetlands, wildlife, and fish?

Construction may generate noise and activity levels that will disturb wildlife in the area.

Temporary clearing or disturbance of vegetation will be likely limited to an area within 5 to 10 feet of the project footprint and the areas needed for staging.

If the project were to adversely affect surface water and groundwater through erosion, sedimentation, leaks, and/or spills, then these things would also adversely affect fish and fish habitat within the project area.

What will be done to minimize the effect of construction on ecosystems?

WSDOT will require the contractor to minimize the area disturbed by construction by limiting the amount of soil exposed and vegetation removed. The contractor will restore the disturbed areas to prevent erosion of exposed soils and enhance wildlife habitat.

Visual Resources

Why are visual resources considered when evaluating transportation projects?

Visual perception is an important component of environmental quality that can be affected by transportation projects. Because of the public nature and visual importance of transportation projects, both negative and positive visual effects must be adequately considered and addressed. When analyzing visual effects of a highway project, two views must be considered: the view from the road or bridge, and the view of the road or bridge.

Aerial view of the existing Evergreen Point Bridge looking west

What views can be seen within the project area?

When looking at SR 520 in the project area, the roadway alternates between sections that are at the same level as the ground around it, below ground level, and elevated above ground level on bridge structures. The Evergreen Point Bridge and roadway figure prominently in many views, and depending upon the vantage point, are a dominant part of the foreground and background.

View of the existing Evergreen Point Bridge looking west from the Eastside

The area where the project will affect visual resources is at the eastern end of the Evergreen Point Bridge. Although heavy vegetation limits views to and from SR 520 on the east side of Lake Washington, westbound drivers at the bridge approach see the Olympic Mountains in the distance on clear days and Husky Stadium and the Seattle shoreline in the middle distance. For viewers on the shoreline north and south of the bridge, the columns and roadbed

of the east approach are a dominant part of the foreground.

What will the project area look like after the SR 520 Variable Tolling Project is completed?

There will be very little visual change in the project area due to the implementation of the SR 520 Variable Tolling Project compared to the No Build Alternative.

The project will place the tolling equipment on the eastern end of the bridge either on the existing truss structure, or on a separate set of gantries near the truss structure. Tolling equipment will include overhead signs on the bridges for each direction of travel, an overhead automobile detection device, antennas, and boxes that will read the transponders, video cameras over each lane to capture license plate images, and either visible or infrared lighting.

In addition, roadside concrete pads with controller cabinets will be located on the east side of the lake just south of SR 520 in WSDOT right-of-way. A backup generator, or simply a generator transfer switch for connection to a portable generator, will be included in case of power outages.

If we install the equipment on the eastern truss structure, it will be barely noticeable to drivers on the bridge. If a gantry needs to be constructed near the eastern truss structure, that will affect the immediate foreground view as drivers approach, but will not affect any midground or background views from the bridge. All options will not be very noticeable looking toward the bridge from the shoreline or lake.

As mentioned, the project will install a new 24 hour light source on the bridge at the tolling location to detect the license plates of passing vehicles. The type of lighting will either be infrared, which would not be visible to the human eye, or visible lighting. If visible lighting is used, it will be activated by passing vehicles and will be at a

low intensity to avoid startling or distracting drivers. The low-intensity video camera lights will be coincident with the higher intensity lights of passing vehicles and the effects will be indistinguishable. In addition, the video camera lights will be directed towards the road deck resulting in minimal light reaching the surrounding environment.

The roadside equipment that will be installed will be small and likely not noticeable from the roadway by the traveling public.

What will be done to minimize visual effects of the project?

The gantry structure added to the bridge will be placed as close as possible to the existing truss structure and painted the same color to avoid foreground impacts.

If roadside equipment is noticeable, vegetative screening will be used to minimize the visual impact.

Will construction affect views?

Construction activities will temporarily affect foreground views due to construction equipment and storage piles. The equipment and storage piles used during construction will be removed upon completion of the project.

To reduce the temporary visual effects during construction, WSDOT will require the contractor to minimize the removal of existing vegetation and locate storage and staging areas in places that are not visually prominent to the extent practical. The contractor will address light and glare associated with nighttime construction activities by using downcast lighting sources.

Cultural Resources

What cultural resources are in the project area?

Our analysis of potential effects to cultural resources focused on the areas that will be physically changed or directly affected by the project. These areas included the Evergreen Point Bridge and approaches, as well as the portion of SR 520 just east of the bridge, where the control pads and cabinets will be located. The project will not have an indirect effect on cultural resources. A more detailed description of the analysis and findings can be found in the *Cultural Resources Technical Memorandum* found in Appendix F.

National Register of Historic Places (NRHP)

The NRHP requires federal agencies to identify and consider the effects of federally assisted projects on historic properties. Historic properties generally must be at least 50 years old, retain physical integrity and meet at least one of the four criteria of significance listed in the National Register Criteria for Evaluation.

Project construction on land will occur entirely in the SR 520 right-of-way, in areas previously disturbed by highway construction. Therefore, there is no potential for the project to affect archaeological historic properties.

We evaluated the Evergreen Point Bridge and approaches (also formally known as the Albert D. Rosellini Bridge) and concluded that the bridge is eligible for the National Register of Historic Places (NRHP).

Why is the Evergreen Point Bridge historically significant?

The Evergreen Point Bridge was completed and placed in service in 1963, four miles north of the first floating bridge on Lake Washington – the Lacey V. Murrow Memorial Bridge. A second floating bridge was considered by local residents as early as 1946, but it wasn't until 1960 that work on the bridge actually began. It took over two years to construct the Evergreen Point Bridge. It was the world's longest floating bridge (1.4 miles), and at $25 million, the world's most expensive. The floating section of the bridge alone cost 10.9 million. The bridge was partially financed by a thirty-five cent toll that helped pay for a forty-year, $30 million bond. The bridge was more widely used than the State Toll Bridge Authority expected: the bond was paid off 24 years early, in June 1979. The toll booths were removed

that year. When the original Lake Washington floating bridge (the Lacey V. Murrow Memorial Bridge) sank in 1990, the Evergreen Point Bridge became Lake Washington's oldest floating bridge.

Although the Evergreen Point Bridge was constructed in 1963, it is eligible for listing in the NRHP. It is eligible under Criterion C for its significance in bridge engineering and Criterion G, "a property achieving significance within the past 50 years if it is of exceptional importance" (NR Bulletin, How to Apply the National Register Criteria for Evaluation). The bridge will be 50 years old in 2013.

Will the project have adverse effects on the Evergreen Point Bridge?

Installation of the tolling equipment on the truss structure will constitute no adverse effect to the historic property under the regulations implementing the National Historic Preservation Act [36 Code of Federal Regulations (CFR) 800.5]. The tolling equipment will not compromise the Evergreen Point Bridge's integrity of location, design, workmanship, materials, setting, feeling, or association. The tolling equipment will only be minimally noticeable from the bridge, and will be limited to signs and some small equipment, such as cameras and transponder readers, over the roadway. This signage and equipment are minor, and will not alter any of the characteristics of the Evergreen Point Bridge that form the basis of its eligibility for listing in the NRHP. Department of Archaeology and Historic Preservation staff, on behalf of the State Historic Preservation Officer, has concurred with this determination.

Public Utilities

What public utilities exist in the project area?

Electricity and Natural Gas

Puget Sound Energy provides electricity and natural gas to Medina, where the project will install tolling equipment. Overhead and underground transmission lines are located adjacent to SR 520.

Water and Sewer Services

Bellevue Utilities Department provides water service to Medina. Various water mains cross under SR 520 to provide services to consumers in the area. Medina maintains its own stormwater drainage system.

The King County Department of Natural Resources Wastewater Treatment Division provides sewer treatment services for the entire project area.

What effects will the project have on public utilities?

There will be no negative effect on utilities due to this project. Some electricity will be required to operate the tolling equipment, compared to the No Build Alternative; however, the amount needed will be negligible.

How will construction affects on utilities be minimized?

WSDOT will require the verification of utility locations with permit and franchise holders during final design. All existing utility locations will be shown on the construction plans. Utility providers will be given advanced notice of construction activities. If utility relocations are necessary, WSDOT will work with the providers to relocate the utility in accordance with state law. In addition, the contractor will verify utility locations as required by law prior to any excavation work.

Land Use

What are the existing land uses in the project area?

SR 520 enters Seattle on the west side of Lake Washington. Land use in this area consists of mostly single-family residential, with scattered commercial uses and publicly-owned open spaces (Department of Planning and Development 2007). The University of Washington campus is located north of Portage Bay and Union Bay, just north of the Evergreen Point Bridge (SR 520).

View of the University of Washington

SR 520 enters Medina on the east side of Lake Washington. Most land use in Medina, Hunts Point, Clyde Hill, and Yarrow Point consists of single-family housing with scattered commercial businesses. A small part of the Lakewood neighborhood in the Kirkland abuts SR 520 just east of Yarrow Point. The Kirkland area is mainly composed of residential areas, park and open space, and office buildings.

Bellevue, located east of Clyde Hill, is the largest city on the east side of Lake Washington that will be affected by the project. The Bellevue area consists of retail and office centers, as well as low-, medium-, and high-density residential neighborhoods. Bellevue considers the area surrounding SR 520 to be a major employment center for the city (City of Bellevue 2008).

What will future land use look like in the project area?

Little change in land use is expected for the area near SR 520 in Seattle (Department of Planning and Development 2007). Likewise, future land uses will not differ from existing uses in the smaller cities of Medina, Clyde Hill, and Hunts Point. Overall, these communities are largely built out, and little growth is anticipated over the next 20 years

However, land use changes are planned for the Bel-Red area of Bellevue situated immediately southeast of the SR 520 and I-405 interchange. On February 17, 2009, the Bellevue City Council approved a plan to guide the transition of the Bel-Red area from light industrial to a mixture of higher density retail, office and residential uses. This land use transition is likely to extend beyond the duration of the SR 520 Variable Tolling Project.

What effect will the project have on land use?

We do not anticipate changes in land use as a result of the project: the duration of the project is too short to change anything but choice of routes to cross Lake Washington.

Hazardous Materials

Hazardous materials can be encountered during the construction and operation of public projects. Examples of common hazardous materials include asbestos, lead-based paint, underground storage tanks, and total petroleum hydrocarbons.

Identifying known and potential contamination prior to construction is important because it can greatly reduce the possibility of exposure to people and the environment.

What contaminated sites are located in the project area?

Our analysis of hazardous materials focused on the east side of the Evergreen Point Bridge because this is the only area where ground will be disturbed by project activity. We identified five sites with recognized environmental conditions within one mile of the proposed location of the concrete pad and utility cabinets to be installed as components of the tolling facility (see Exhibit 5-10).

What are recognized environmental conditions?

Recognized environmental conditions refer to sites with past or present contamination of soil or groundwater. These sites are determined through literature searches, site observation, and best professional judgment.

Exhibit 5-10
Potentially Hazardous Materials in the Project Area (WSDOT 2006)

Will the project affect hazardous materials sites?

Construction will not occur on or adjacent to any sites with recognized environmental conditions. Construction will be wholly within WSDOT right-of-way and remote from these sites.

How will the effects of hazardous materials be minimized during construction?

WSDOT will specify in the construction documents that the contractor will avoid releasing or spreading any contaminated soil or groundwater encountered during construction. If excavation or dewatering of contaminated material is necessary, the contractor will properly segregate and contain the material during and after excavation and dewatering and will test the material to determine how it can be disposed of. The

contractor will handle and dispose of the material in accordance with applicable regulations.

Energy

Are there effects to energy associated with the project?

What is fuel efficiency?

For vehicles, fuel efficiency refers to how far a vehicle can travel per unit of fuel. This measure is usually expressed in miles per gallon or kilometers per liter.

Fuel used by vehicles on SR 520 will be the main energy use related to this project. Therefore, this section focuses on fuel efficiency, particularly as related to congested driving conditions. The SR 520 corridor is heavily traveled and frequently congested. Current heavy traffic volumes on SR 520 force vehicles to travel at less efficient speeds during many hours of the day.

According to the U.S. Department of Energy, fuel efficiency is greatest when vehicles travel between 45 and 55 mph. Because of the current conditions on SR 520, vehicles are often traveling below 45 mph during peak periods and are, therefore, traveling at less efficient speeds.

Traffic along SR 520 often creates stop-and-go conditions, which reduces fuel efficiency

Compared to the No Build Alternative, the project will improve traffic flow, reduce peak period traffic congestion along SR 520, and allow more cars to travel at more fuel efficient speeds. In addition, because the construction for the project is minor, very little energy will be expended to build it.

Since the project will improve traffic flow and increase average peak hour speeds, we anticipate that it will reduce overall energy consumption.

What measures will be taken to reduce effects on energy during construction?

WSDOT will develop specifications for project construction to encourage energy conservation. WSDOT will also adhere to construction practices that promote efficient energy use, such as limiting idling equipment, encouraging construction workers to carpool, and locating staging areas near work sites.

Noise

Environmental noise may interfere with a broad range of human activities in a way that degrades public heath and welfare. Therefore, traffic and construction noise analyses are required by law for federally funded projects and by State of Washington policy for other projects. Since this particular project is not adding lanes,

or changing the roadway configuration in any way, a full quantitative noise analysis with noise modeling is not required. However, we conducted a qualitative analysis to determine the potential for noise effects.

What is sound (noise)?

Sound can be defined as any change in air pressure that the human ear can detect from barely perceptible sounds to sound levels that can cause hearing damage. For example, sitting in the front row of a rock concert would have greater changes in air pressure compared to a quiet whisper in the library. When sounds are perceived as unpleasant, unwanted, or disturbing, they are normally considered "noise.".

What was the project area analyzed for this project?

According to the WSDOT *Traffic Noise Analysis and Abatement Policy and Procedures* (2006), all noise sensitive sites within 500 feet of the proposed edge of pavement should be evaluated for potential noise effects.

What are noise-sensitive sites?

A location of an outdoor area where frequent human activity takes place that may be affected by highway traffic noise.

What criteria are used for assessing noise effects?

The FHWA Noise Abatement Criteria (NAC) defines noise levels for land activity categories. WSDOT has adopted these NAC and defines noise levels that, if approached [within 1 decibel (dBA)] or exceeded, require noise abatement consideration (see Exhibit 5-11 for various land use categories). FHWA guidelines also state that noise abatement should be considered when the noise levels substantially exceed the existing noise levels [23 CFR 772.5(g)]. This criterion is defined by WSDOT as increases in the Leq of 10.0 dBA or more above existing noise levels.

What are some key terminologies used to describe noise?

Decibels—a decibel is a unit of measure for sound.

dBA—This represents the noise levels in decibels measured with an A-weighted frequency. The A-weighted frequency corresponds to the frequencies that the human ear can detect.

What are typical neighborhood noise levels?

Typically, nighttime noise levels are lower than daytime levels since most people are more active during the day. In general, rural areas can have noise levels ranging from 50 to 60 dBA, and urban areas can have noise levels as high as 70 to 80 dBA.

Exhibit 5-11
Noise Abatement Criteria, Hourly A-Weighted Sound Level Decibels (dBA)

Activity Category	$L_{eq(h)}$	Description of Activity Category
A	56 (exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	66 (exterior)	Picnic area, recreational areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	71 (exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	None	Undeveloped lands.
E	51 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

How will the proposed project affect noise levels?

SR 520 is currently at capacity for much of the day. Compared to the No Build Alternative, traffic levels on SR 520 will be reduced between 11 percent and 18 percent as a result of implementing the variable toll. Typically, a reduction in traffic volumes by 25 percent will only reduce noise levels by one decibel. Therefore, we do not anticipate that there will be a substantial difference in future noise levels on SR 520 compared to existing noise levels.

We anticipate that I-90 will experience more of an increase in traffic volumes due to tolling SR 520 compared to other alternate routes, since this corridor would be the shortest alternate route for travelers crossing Lake Washington. SR 522 will have the lowest increase in traffic volumes since travelers would have a longer trip compared to using the SR 520 and I-90 corridors. Since these routes will receive additional traffic, some additional noise will occur as well. A doubling of traffic corresponds to an increase in noise of three decibels, which is typically the minimum change in noise level perceptible to the human ear. Because the total traffic increases along these routes will not be more

than one percent to four percent, noise levels are not likely to increase over one decibel. The change in noise levels on alternate routes is unlikely to be perceptible.

Will noise levels be affected by construction activities?

Construction of tolling

Noise levels will temporarily increase as a result of construction activities. These activities will only take place in Medina. Medina, like most cities, relies on the Washington Administrative Code (WAC), Chapter 173-60, Maximum Environmental Noise Levels.

The WAC states that construction activities should be conducted during daytime hours. If activities must occur during the nighttime hours, a noise variance will be required. Exhibit 5-12 summarizes the allowable exceedances for construction equipment during construction activities.

Exhibit 5-12
Washington State General Construction Allowable Exceedance

Allowable Exceedance	Equipment Covered
25 dBA	Equipment on construction sites, including, but not limited to, crawlers, tractors, dozers, rotary drill and augers, loaders, power shovels, cranes, derricks, graders, off-highway trucks, ditchers, trenches, compactors, compressors, and pneumatic-powered equipment
20 dBA	Portable-powered equipment used for temporary locations in support of construction activities, such as chainsaws, log chippers, lawn and garden equipment, and powered hand tools.
15 dBA	Powered equipment used in temporary repair or periodic maintenance of the grounds, such as lawn mowers and powered hand tools.

How will noise effects be avoided or minimized during construction?

Shielding of Stationary Equipment Generators are typically used during construction activities; shielding them with hay bales helps to reduce noise effects.

The following is a list of typical noise mitigation measures that may be included in construction specifications:

- Require all engine-powered equipment to have mufflers installed according to manufacturer's specifications.
- Require all equipment to comply with pertinent U.S. Environmental Protection Agency (EPA) equipment noise standards.

- Limit the nosiest construction equipment to daytime hours.
- Minimize noise by regular inspection and replacement of defective mufflers and parts.
- Locate stationary construction equipment far from nearby noise-sensitive sites.
- Install temporary barriers around stationary construction noise sources.
- Minimize or avoid idling of equipment.
- WSDOT will use the Occupational Safety and Health Act (OSHA)-approved ambient sound-sensing backup alarms that can reduce disturbances at night.

Air Quality

Why is air quality considered when evaluating transportation projects?

Air quality can be affected by transportation projects through increased pollutants including vehicle engine emissions and airborne particulates. Exposure to these pollutants can adversely affect human health (e.g. respiratory problems), vegetation, and wildlife.

Who regulates air quality?

The EPA, the Puget Sound Clean Air Agency (PSCAA), and the Washington State Department of Ecology regulate air quality in the project area.

What are the standards for air pollutants?

The Clean Air Act of 1970, which was last amended in 1990, requires the EPA to set concentration standards for criteria air pollutants. These concentration standards are known as the national ambient air quality standards (NAAQS). The criteria pollutants include: ozone, carbon monoxide, particulate matter (PM10 and PM2.5), sulfur dioxide, nitrogen dioxide, and lead. The Washington

What are criteria pollutants?

Ozone (O3)—is a gas which occurs in the atmosphere when compounds from sources such as cars, trucks, power plants, and factories react with sunlight.

Carbon Monoxide (CO)—is an odorless, colorless, and toxic gas which is emitted from auto, truck, or bus exhaust on roadways and in parking areas.

Particulate Matter (PM)—consist of particles found in the air such as dust, dirt, soot, or smoke and is directly emitted from construction sites, unpaved roads, fields, smokestacks, or fires.

Nitrogen Dioxide (NO2)—consists of airborne particles that can often be seen as a reddish brown layer over many urban areas. Sources include on-road vehicles, non-road equipment, fossil fuel combustion, industrial processes, waste disposal, and fire.

State Department of Ecology and the PSCAA have adopted state and local ambient air quality standards that are equivalent to or more stringent than EPA's NAAQS (see Exhibit 5-13). Pollutants typically associated with today's vehicle traffic are ozone, carbon monoxide, particulate matter, and nitrogen dioxide. Therefore, sulfur dioxide and lead are not discussed in this section.

Exhibit 5-13
National, State, and Local Ambient Air Quality Standards

Pollutant	National	Washington State	Puget Sound Region
Ozone 1 hour	0.075* ppm	0.12 ppm	0.12 ppm
Ozone 8 hour	0.075 ppm	n/a	n/a
Carbon Monoxide 1 hour	35ppm	35 ppm	35 ppm
Carbon Monoxide 8 hour	9 ppm	9 ppm	9 ppm
Nitrogen Dioxide 1 hour	n/a	n/a	n/a
Nitrogen Dioxide Annual	0.053 ppm	0.053 ppm	0.053 ppm
Particulate Matter (PM_{10}) 24 hour	150 ug/m^3	150 ug/m^3	150 ug/m^3
Particulate Matter (PM_{10}) Annual	50 ug/m^3	50 ug/m^3	50 ug/m^3
Particulate Matter ($PM_{2.5}$) 24 hour	35 ug/m^3	n/a	n/a
Particulate Matter ($PM_{2.5}$) Annual	15 ug/m^3	n/a	n/a

Notes:
*ppm=parts per million by volume; +ug/m^3=micrograms per cubic meter
n/a = No standard established.
Source:U.S. Environmental Protection Agency

What are conformity requirements?

Under the Clean Air Act, the SR 520 Variable Tolling Project must be in compliance with the NAAQS for all criteria pollutants. The project is located within King County in the Central Puget Sound Region. EPA has designated King County as a maintenance area for ozone, carbon monoxide, and particulate matter (PM10 only).

Attainment Area

An area designated by EPA where concentrations of a given pollutant are measured below the NAAQS.

Maintenance Area
An area that was formerly designated by EPA as a nonattainment area but whose recent monitoring data show pollutant levels have dropped below the NAAQS for a given pollutant. Although an area is considered attainment, it is subject to a 10-year maintenance period to ensure pollutant levels do not rise above the standards.

Nonattainment Areas
An area designated by EPA where concentrations of a given pollutant are above the NAAQS over a period of 3 years.

All nonattainment and maintenance areas are subject to the transportation conformity requirements set out in the Clean Air Act (40 CFR parts 51 and 93) and the Washington Clean Air Act.

Projects exempt from these conformity requirements include those that maintain the existing transportation facility, or improve mass transit or air quality, and are considered to have a neutral affect on air quality. The project is not proposing to construct additional travel or turn lanes; therefore, this project is exempt from a project-level hot-spot analysis for carbon monoxide.

The Clean Air Act requires transportation projects to conform to the State Implementation Plan (SIP), which means that the transportation activities will not produce new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. The SR 520 Variable Tolling Project is included in the SIP.

What are Mobile Source Air Toxics?

In addition to criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. NAAQS have not been established for Mobile Source Air Toxics (MSATs). Most air toxics originate from human-made sources, including on-road mobile sources (automobiles and trucks), non-road sources (airplanes), area sources (dry cleaners), stationary sources (factories or refineries), and non-road equipment (forklifts, backhoes, etc.). There are six primary Mobile Source Air Toxics: benzene, acrolein, formaldehyde, 1,3-butadiene, acetaldehyde, and diesel exhaust.

What are MSATs?

Mobile Source Air Toxics:

Benzene—is a colorless liquid with a sweet odor used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides.

Acrolein—is a colorless or yellow liquid with a disagreeable odor used as a pesticide to control algae, weeds, bacteria, and mollusks.

Formaldehyde—is a colorless, pungent-smelling gas. Sources include pressed wood products, cigarette smoke, and fuel-burning appliances.

1,3–butadiene—is a colorless gas with a mild gasoline-like odor and made from the processing of petroleum.

Acetaldehyde—is also known as ethanol and results from combustion, such as automotive exhaust and tobacco smoke.

Diesel exhaust—airborne contaminant in workplaces where diesel is used.

How will the project affect air quality?

Traffic congestion contributes to the amount of air pollutants emitted into the air. The most common pollutants include carbon monoxide and particulate matter. Reducing congestion and allowing free flow of traffic will indirectly help to reduce air emissions compared to the No Build Alternative.

Implementation of tolling on SR 520 is anticipated to divert some traffic to alternate routes, such as I-90, SR 522, I-5, and I-405. Therefore, traffic will be reduced on SR 520 by approximately 11 to 18 percent, which will reduce emissions along SR 520 for all pollutants. However, traffic and emissions are anticipated to slightly increase along these alternate routes. Construction of the SR 520 tolling is anticipated to begin in 2009. By 2010, VMT along the alternate cross-lake routes is anticipated to increase compared to the No Build Alternative. I-90 would increase two to three percent and SR 522 would increase one to two percent. The north-south corridors were also analyzed showing no change in VMT along I-5 and a one to two percent decrease of VMT along I-405. The decrease in VMT along I-405 may be due to travelers choosing the nearest alternate cross-lake route instead of using SR 520.

Vehicle Miles Traveled (VMT)

VMT stands for vehicle miles traveled and is the number of miles vehicles travel each year. For transportation projects with set boundaries, VMT can refer to the aggregate number of miles that all the vehicles travel using the specified roadways.

Even though there would be a slight increase in VMT along the alternate cross-lake routes, the total VMT for all routes added together would decrease, which indicates travelers are choosing to travel during non peak hours, use more transit options during peak hours, or choose not to make the trip at all. Therefore, this project is not anticipated to have an adverse effect on air quality.

EPA has developed several emissions control programs for vehicle engines and fuels that will reduce MSAT emissions over the next 20 years. These programs include reformulated gasoline, national low-emission vehicle standards, Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and proposed heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Even if VMT increases, future MSAT emissions are likely to be lower than present levels due to these EPA programs. (FHWA 2006)

Will construction activities temporarily generate air pollutants?

Construction activities will temporarily generate air pollutants within the project area. Particulate matter (fugitive dust) is the most common air pollutant emitted during construction activities. Fugitive dust may become airborne during material transport, grading, driving of vehicles and machinery on and off site, and through high winds.

How will adverse effects from construction activities be avoided or minimized?

The construction contractor will be required to control fugitive dust during construction activities.

The following BMPs to control fugitive dust are typically used during construction activities:

- Spraying exposed soil with water or other suppressant to reduce emissions and deposition of particulate matter.
- Using phased development to keep disturbed areas to a minimum.
- Using wind fencing to reduce disturbance to soils.
- Minimizing dust emissions during transport of fill materials or soil by wetting down or by ensuring adequate freeboard (space from the top of the material to the top of the truck bed) on trucks.
- Cleaning up spills of transported material on public roads promptly.
- Scheduling work task to minimize disruption of the existing vehicle traffic on streets.
- Locating construction equipment and truck staging areas away from sensitive receptors, as practical, and in consideration of potential effects on other resources.

- Providing wheel washers to remove particulate matter that will otherwise be carried off site by vehicles to decrease deposition of particulate matter on area roadways.
- Covering dirt, gravel, and debris piles as needed to reduce dust and wind-blown debris.

Mitigation strategies to reduce MSAT emissions include:

- Reducing engine activity.
- Redirecting work or changing shift times to avoid community exposures.
- Making adjustments to equipment, including PM traps, oxidation catalysts, and other devices that provide an after-treatment of exhaust emissions.
- Using clean fuels, such as ultra-low sulfur diesel.