SUMMARY

PURPOSE AND NEED FOR ACTION

Washington State Department of Transportation (WSDOT) has joined with the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Central Puget Sound Regional Transit Authority (Sound Transit), King County, and local governments to develop strategies to reduce traffic congestion and improve mobility in the Interstate 405 (I-405) corridor from Tukwila in the south to Lynnwood in the north (Figure S-1). Interstate 405 is the region's dominant north-south travel corridor east of I-5, and it is the designated military route due to I-5 being deemed too constricted. At present, I-405 varies from six to ten lanes along the 30-mile corridor.

The need identified for the I-405 Corridor Program is to improve personal and freight mobility and reduce foreseeable traffic congestion in the corridor in a manner that is safe, reliable, and cost-effective.

The purpose of the proposed action is to provide an efficient, integrated, and multimodal system of transportation solutions within the I-405 corridor that meet the project need in a manner that:

- Provides for maintenance or enhancement of livability for communities within the corridor;
- Provides for maintenance or improvement of air quality, protection or enhancement of fish-bearing streams, and regional environmental values such as continued integrity of the natural environment;
- Supports a vigorous state and regional economy by responding to existing and future travel needs; and
- Accommodates planned regional growth.

DESCRIPTION OF THE PROPOSED ACTION

The decision to be made through the I-405 Corridor Program is to identify the best mix of modal solutions, transportation investments, and demand management to improve movement of people and goods throughout the I-405 corridor, reduce foreseeable traffic congestion, and satisfy the overall program purpose and need.

The proposed action includes a wide range of improvements, each of which serves one or more of the following corridor solutions:

- Implement an enhanced transportation demand management (TDM) program (see Section 5, Glossary, for definition of TDM and other terms used within this EIS);
- Expand the capacity of the existing local bus transit system;
- Implement new bus rapid transit within the corridor;
- Implement new fixed-guideway high-capacity transit (HCT) within the corridor;
- Expand the capacity of the existing I-405 freeway; and
- Expand the capacity and improve the continuity of the adjacent arterial network.

Implementation of the proposed action will involve a cooperative effort involving over 30 agencies that have responsibilities for planning, regulating, and implementing transportation improvements in the 250+ square-mile corridor.

In Spring 2002, *Destination 2030*, the regional metropolitan transportation plan, was updated and refined by the Puget Sound Regional Council (PSRC) to fully reflect and incorporate the transportation improvements contained in the I-405 Corridor Program Preferred Alternative. The improvements will also be included in the Washington State Transportation Plan. It is also anticipated that the I-405 Corridor Program recommendations will be adopted into the transportation plans and programs of the local jurisdictions as appropriate.

ENVIRONMENTAL REVIEW

This Final Environmental Impact Statement (FEIS) has been prepared in accordance with applicable requirements of the National Environmental Policy Act (NEPA), the Washington State Environmental Policy Act (SEPA), and their implementing regulations.

The I-405 Corridor Program also is a national pilot study for the "Transportation Decision Making Process Improvement." This revised decision-making process (typically referred to as "Reinventing NEPA") is jointly sponsored by the Washington State Department of Transportation, the Federal Highway Administration, and the Federal Transit Administration, and was developed to evaluate and improve the application of the NEPA process.

The Reinventing NEPA process moves NEPA decision-making to the early stages of long-range planning for transportation projects. It also seeks to ensure early participation of affected regulatory agencies and jurisdictions by introducing a series of coordination and consensus points at key milestones and decision points throughout the environmental analysis, documentation, and review process. These process improvements are expected to provide a longer window within which to resolve environmental issues, the potential for a greater range of environmental solutions, and improved certainty that decisions will not have to be revisited later during project development and permitting.

It is important to recognize that the I-405 Corridor Program is a programmatic EIS as compared to a project-level EIS, which is much more detailed. Because of this, the I-405 Corridor Program EIS does not focus on specific design details or precise footprints for each of the nearly 300 individual transportation improvements that are being considered. Instead, it examines the broad corridor-wide issues related to mode choice, general location of improvements, and how combinations of improvements may function together as a system to solve corridor-wide transportation problems. This programmatic analysis is appropriate and necessary at this early stage in the transportation planning and decision-making process, when many project-level design details are not meaningful in evaluating effects on mobility, transportation performance, and environmental quality across such a large area.

This programmatic analysis is consistent with the intent of NEPA, which specifically provides for a more broad EIS to be prepared for a program, followed by a subsequent EIS or other environmental assessment prepared for an action included within the overall program (40 CFR 1502.20). This approach may also be appropriate for environmental analysis and documentation for different stages of an action (40 CFR 1508.28). In either case, it allows lead agencies to bring focus to the issues that are ripe for decision and to exclude from consideration issues that are already decided or not yet ripe.

Legend: Location Map

- Study Area Boundary
- County Boundaries
- Highways
- Roadways
- Railways

N

1 0 1 2 3 Miles

Mill Creek
Lynnwood
Edmonds
Woodway
Mountlake Terrace
Brier
Bothell
SNOHOMISH
KING
Shoreline
Lake Forest Park
Kenmore
Woodinville
Simonds Rd NE
Duvall
NE 128th St
Kirkland
Redmond
Lake Washington
Union Bay
Lake Union
Yarrow Point
Hunts Point
Clyde Hill
Medina
NE 8th St
Bellevue
Lake Sammamish
Redmond Fall City Rd
Seattle
Beaux Arts
Mercer Island
148th Ave SE
Sammamish
Duwamish River
Coal Creek Pky SE
Newcastle
Issaquah
Tukwila
SE 128th St
Renton
Burien
Normandy Park
SeaTac
SE Petrovitsky Rd
68th Ave
132nd Ave SE
Kent
Des Moines
Covington
Auburn
Federal Way

CANADA
Washington
Everett
Seattle
Tacoma
Area of Detail
Oregon

Location Map

Figure S-1

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Subsequent NEPA and SEPA environmental analysis, documentation, and review will enable decisions regarding site-specific, project-level details on alignments, high-capacity transit technology, project impacts, costs, and mitigation measures.

Project improvements contained within the Preferred Alternative will be re-examined individually and in combination for phased implementation based on a number of considerations, including: revised cost estimates; availability of funding; contribution to improved transportation system operation, congestion relief, mobility, and safety; equity of improvements within the corridor; relationship to other planned and potential improvements within the region and study area; logical construction sequencing and minimization of construction impacts; beneficial and adverse environmental impacts; opportunities for early-action mitigation; demonstration of projects' independent utility and logical termini; anticipated requirements for NEPA/SEPA environmental analysis, documentation, and review; and ability to achieve rapid results, among others.

The Preferred Alternative project improvements are expected to be examined next within four logical corridor sections:

1. I-5 in Tukwila to N 3rd Street in Renton, including improvements to SR 167;
2. N 3rd Street in Renton to SE 8th Street in Bellevue;
3. SE 8th Street in Bellevue to NE 132nd Street in Kirkland; and
4. NE 132nd Street in Kirkland to I-5 in Lynnwood.

The projects, or combinations of projects, that could be advanced for initial implementation is not known at this time. For this reason, the level of NEPA/SEPA environmental analysis, documentation, and review that will be required also cannot be known until more specific proposals for project improvements and phasing are advanced. It is anticipated that improvements to the I-405/SR 167 interchange will be among the hot spots identified for early implementation. It also is likely that environmental review for the I-405 corridor improvements could include the full range of NEPA and/or SEPA environmental analysis, documentation, and review, as appropriate. This would include a combination of categorical exclusions, categorical exemptions, environmental assessments, checklists, EISs, and supplemental EISs.

In the preparation of this EIS, expertise reports or technical memoranda were prepared for the following environmental disciplines and topics:

- Air quality
- Cultural and historic resources
- Displacements and right-of-way acquisition
- Economic impacts
- Energy
- Environmental Justice
- Farmlands
- Fish and aquatic habitat
- Floodplains
- Geology and soils/seismic hazards
- Hazardous materials and wastes
- Land use
- Noise
- Parks and recreation resources
- Land use and transportation plans and policies
- Public services
- Shorelines
- Social impacts

- Surface water and groundwater
- Threatened and endangered species
- Transportation
- Utilities
- Visual quality
- Wetlands
- Wildlife and upland habitat
- Section 4(f) resources

These reports describe the affected environment, anticipated environmental impacts associated with the proposed improvements, and potential measures that could be implemented to avoid or reduce environmental impacts. The FEIS supercedes all language and findings in the draft expertise reports and technical memoranda and the Draft EIS.

Copies of the expertise reports and subsequent addenda and errata are available for review at the Washington State Department of Transportation in Seattle (see address on Page c).

During the scoping phase of the I-405 Corridor Program Draft EIS (DEIS), the large number of potential improvements were grouped into four action alternatives for analysis of relative impacts. While each action alternative has a different emphasis (HCT/TDM, general capacity, etc.), all the alternatives include a mix of types of transportation solutions. After consideration of all public and agency comments received on the Draft EIS, and based on careful review of the anticipated transportation performance and environmental effects of the DEIS alternatives and other potential solutions volunteered during the comment period, a multimodal solution that is very similar to Alternative 3, Mixed Mode Emphasis, was identified as the Preferred Alternative. The four DEIS action alternatives, the Preferred Alternative, and the No Action Alternative are summarized below.

REASONABLE ALTERNATIVES EVALUATED IN THE EIS

The alternatives advanced for detailed study in the EIS draw upon a mix of transportation system elements. Each of the action alternatives includes a unique combination of these elements to provide a distinct modal emphasis. The major transportation elements include:

- Implementing a range of transportation demand management (TDM) measures
- Expanding the capacity of the existing I-405 freeway
- Expanding the capacity and improving the continuity of the adjacent arterial network
- Expanding the capacity of the existing bus transit system
- Implementing new high-capacity transit within the corridor

The four action alternatives evaluated in the DEIS are:

- Alternative 1 — High-Capacity Transit/TDM Emphasis
- Alternative 2 — Mixed Mode with HCT/Transit Emphasis
- Alternative 3 — Mixed Mode Emphasis
- Alternative 4 — General Capacity Emphasis

The No Action Alternative and the Preferred Alternative also were evaluated. Figures illustrating each alternative are presented in Section 2.

The Preferred Alternative was identified because it best meets the identified purpose and need for the I-405 Corridor Program based on its superior transportation performance, its balanced

system of roadway, transit, and TDM strategies, and its ability to avoid or effectively mitigate environmental impacts and to enhance key environmental features.

After careful study and following consideration of public and agency comments received on the Draft EIS (contained in Volume 2 of the FEIS), the co-lead agencies concluded that Alternative 1 would not meet the adopted purpose and need because of its inability to provide meaningful long-term improvement in general purpose mobility, freight mobility, or reduction in foreseeable traffic congestion. The basis for this conclusion is discussed in greater detail under operational impacts in Section 3.12.4.2 of the Final EIS.

No Action Alternative

The No Action Alternative generally includes all of the committed and funded highway and transit capital improvement projects in the study area belonging to the cities, counties, Sound Transit, and WSDOT (see Appendix A and Appendix B). These projects are expected to be implemented over the next six years. Limited expansion of state highways is expected, while several arterial improvements are being implemented by local agencies. Phase I of Sound Transit's Sound Move plan is included. Transit service levels by 2020 are based upon the Puget Sound Regional Council (PSRC) Metropolitan Transportation Plan. A 20 percent increase in transit service hours is assumed by 2020 (not including the effects of recent transit service reductions). By 2020, the PSRC model assumes that employment-area parking costs in the area will increase due to market forces, creating greater demand for transit services and transportation demand management (TDM) measures.

Alternative 1 – High-Capacity Transit/TDM Emphasis

This alternative would minimize addition of new impervious surface, maximize the use of transit, and include construction of a physically separated, fixed-guideway HCT system serving the major activity centers within the I-405 corridor. Emphasis also would be placed on non-construction treatments such as transit signal priority and transportation demand management strategies. As in the other action alternatives, Alternative 1 would include doubling local bus transit service levels, arterial high-occupancy vehicle (HOV) priority for transit, additional park-and-ride capacity, additional transit center capacity, and pedestrian and bicycle improvements. TDM strategies would be similar to those in the other action alternatives. However, in this alternative, regional pricing strategies similar to those considered in current PSRC studies are evaluated. There would be basic improvements to I-405 with no additional general purpose lanes. Arterial improvements would include limited arterial HOV/transit treatments to facilitate access to I-405 and the HCT system.

Alternative 2 – Mixed Mode with High-Capacity Transit/Transit Emphasis

This alternative would maximize the use of transit through the implementation of a fixed-guideway physically separated HCT system like that described in Alternative 1 combined with a doubling of local bus transit service within the study area, arterial HOV priority for transit, additional park-and-ride capacity, additional transit center capacity, and pedestrian and bicycle improvements. Carpools and express buses would benefit from completion of the HOV freeway-to-freeway ramps along I-405. For general traffic mobility, I-405 would be widened by one lane in each direction. Connecting arterial and freeway capacity improvements and planned arterial improvements would be completed by local jurisdictions. Alternative 2 also would include improvement of the I-405/SR 167 interchange and widening a portion of SR 167 south of I-405 by one lane each direction.

Alternative 3 – Mixed Mode Emphasis

This alternative would provide expansion of I-405 by up to two lanes in each direction, along with improving major interchanges and connecting arterial/freeway capacity. The I-405/SR 167 interchange would be improved, and a portion of SR 167 south of I-405 would be widened by one lane each direction. Selected arterial "missing links" would be completed together with arterial improvements planned by local jurisdictions. A bus rapid transit (BRT) system would be implemented throughout the I-405 corridor with appropriate east-west connections to Redmond and Issaquah. This system would consist of express buses operating in improved access HOV lanes on I-405, I-90, and SR 520. The BRT system would provide superior transit service by use of HOV priority lanes, frequent schedules, and easily accessible stations. Local bus transit service within the study area would be doubled as in Alternative 1. HOV direct access ramps on I-405, arterial HOV priority for transit, additional park-and-ride capacity, additional transit center capacity, and pedestrian and bicycle improvements would be provided. Truck freight traffic improvements would also be highlighted.

Alternative 4 – General Capacity Emphasis

This alternative would maximize freeway capacity by providing three additional lanes in each direction within the I-405 corridor. These would include one additional general purpose lane in each direction on I-405 in most segments, along with a four-lane I-405 express roadway (two lanes in each direction). The I-405/SR 167 interchange would be improved, and a portion of SR 167 south of I-405 would be widened by up to two lanes in each direction. Arterial improvements would include planned actions by local jurisdictions along with expansions to major arterial routes and connections to I-405. Selected arterial "missing links" would be constructed and capacity on north-south arterials would be expanded with jurisdictional approval. Transit and carpools would benefit from completion of freeway-to-freeway HOV connections along I-405. The existing HOV lane system would continue to provide the infrastructure for regional transit movements. Local bus transit service within the study area would be expanded by 50 percent. Additional park-and-ride capacity and pedestrian and bicycle improvements would be provided. Truck freight traffic movements would benefit from the expanded road capacity together with other corridor actions to enhance freight operations.

Preferred Alternative

The Preferred Alternative would provide expansion of I-405 by up to two lanes in each direction, along with improving major interchanges and connecting arterial/freeway capacity. In addition, collector-distributor lanes would be added along I-405 at locations where they are warranted. Similar to Alternative 3, the I-405/SR 167 interchange would be improved; SR 167 would be widened by up to two lanes in each direction south of I-405 to S 180th Street in Kent. The expanded list of arterial capacity and continuity improvements included in Alternative 4 would be implemented, together with arterial improvements planned by local jurisdictions. A bus rapid transit system would be developed throughout the I-405 corridor with east-west connections to Redmond and Issaquah, as described for Alternative 3. Local bus transit service within the study area would be increased by up to 75 percent based on demand. HOV direct access ramps on I-405, arterial HOV priority for transit, additional park-and-ride capacity, additional transit center capacity, and pedestrian and bicycle improvements would be provided.

The freeway design includes an added 4-foot buffer between the general purpose lanes and the HOV lane on I-405. The 4-foot buffer separation will allow for HOV safety and operations, and will also allow for future consideration of an expanded managed lanes operation along I-405.

Truck freight traffic improvements and an expanded package of TDM strategies similar to Alternative 1 also would be implemented. The expanded TDM strategies may include pricing if adopted as part of a regional pricing policy.

For an expanded discussion of the Preferred Alternative, including its similarities to and differences from Alternative 3, please refer to Chapter 2, Description of Alternatives. Please see especially Table 2.2-1, Table 2.2-2, Figure 2.2-6, and Section 2.2-6. For a detailed comparison of the specific transportation improvements and mobility solutions contained within each alternative, please refer to Appendix B, I-405 Corridor Program EIS Alternatives Project Matrix.

GENERAL COST ESTIMATE AND SCHEDULE FOR THE ACTION ALTERNATIVES

Cost Estimate

Over 300 transportation improvements were identified as potential solutions to meet the intent of the Purpose and Need for the I-405 Corridor Program. Recommendations included a wide range of strategies in various modes and locations.

An estimate of cost was prepared for each of the improvements to reflect the initial public cost of providing the improvement. For capital projects, such as roadway construction, the estimate included preliminary engineering, right-of-way acquisition, construction, construction management, and contingencies. Program costs were estimated for elements such as travel demand management. Annual maintenance and operation costs were not included. All costs were estimated in year 2000 dollars.

The action alternatives were developed by combining individual transportation improvements that best fit the emphasis of the alternative. Table S-1 presents the preliminary alternative costs summarized by mode.

Table S-1: Preliminary Alternative Costs Summarized by Mode

Element	Cost in Millions - Year 2000[a]					
	No Action Alternative	Alternative 1 HCT/TDM Emphasis	Alternative 2 Mixed Mode with HCT/Transit Emphasis	Alternative 3 Mixed Mode Emphasis	Alternative 4 General Capacity Emphasis	Preferred Alternative Mixed Mode Emphasis
Transportation Demand Management	--	$72.8	$72.8	$72.8	$72.8	$72.8
Freeway General Purpose	$7.0	$768.6	$2,846.0	$4,482.9	$9,397.6	$4,614.5
Freeway HOV[b]	$463.6	--	$800.9	$996.6	$886.8	$1,048.0
Arterial General Purpose	$185.6	--	$463.6	$663.3	$849.3	$765.9
Arterial HOV	--	$217.2	$194.6	$194.6	--	$185.5
High-Capacity Transit	--	$4,018.4	$4,018.6	--	--	--
Transit Services and Park-and-Ride	$20.4	$172.2	$168.7	$319.6	$83.2	$825.1
Pedestrian and Bicycle	--	$67.4	$67.4	$67.4	$42.8	$67.4
Total Cost	**$676.6**	**$5,316.6**	**$8,632.6**	**$6,797.2**	**$11,332.5**	**$7,579.2**

[a] Totals do not include maintenance and operation costs.
[b] Freeway HOV costs include bus rapid transit and direct access connections.
Note: No Action Alternative costs are not included in the estimates for the action alternatives.

Maintenance and operation costs were not included in the preliminary alternative costs because the intent was to capture only the initial public cost of providing the improvement. Annual

maintenance and operation costs are funded from jurisdictions through their ongoing programs, but funding has not been secured nor committed by jurisdiction.

Funding, Schedule, and Implementation

Approximately 150 projects or actions were identified in the Preferred Alternative, a 20-year vision for the corridor that will be the responsibility of WSDOT, Sound Transit, King and Snohomish counties, and the local agencies falling within the study area. For planning purposes the cost of the Preferred Alternative was estimated at approximately $7.8 billion dollars in year 2002 dollars. WSDOT will be the lead for implementing the freeway portion of the project estimated at about $6.3 billion (year 2002 dollars). The project costs are currently undergoing a review and will likely be changed. Sound Transit and King County will be lead agencies for implementing most of the transit improvements, and local governments will lead the arterial improvements.

Availability of funding to implement the projects listed in the Preferred Alternative is uncertain. Over time, a limited number of projects could be funded through current capital improvement projects administered by the local agencies. However, the existing state transportation funding sources cannot fund the major capacity and operational improvements contained in the program by itself in a timely way.

The bulk of the funding required for implementation of the Preferred Alternative will require new revenue sources. The Washington State Legislature, in the 2002 session, provided for statewide and regional 10-year transportation funding packages that included revenues for the I-405 Corridor Program. Both revenue proposals will require a public vote. The statewide ballot measure, Referendum 51, will be voted on by the public in November 2002, and includes $1.77 billion for I-405 subject to certain conditions and limitations.

Engrossed Second Substitute Senate Bill 6140 provides for creation of a regional transportation investment district (RTID) for the purpose of developing, constructing, and financing transportation projects. A regional package of projects is in the process of development and will be presented for public vote in the future. Revenues from the regional package will most likely include significant funding for roads and transit projects within the I-405 Corridor Program. Though specific projects and levels of funding have not been developed, this and the statewide ballot measure could provide approximately $3.5 billion dollars for I-405 investments in the next 10 years.

Another potential revenue source for the high-capacity transit (HCT) capital and service elements contained in the Preferred Alternative's BRT system development proposal are tax revenues collected within the Central Puget Sound Regional Transit Authority district and administered by Sound Transit. In 1996, the three county urbanized area voted to adopt a 10-year regional plan, "Sound Move", and approved a 4.0 percent increase in total sales tax and a 0.3 percent increase in the motor vehicle excise tax (MVET). Sub-regional "firewalls" were established to assure tax revenues generated within each of the five identified sub-areas of the district would be programmed to HCT improvements benefiting those sub-areas. Some of the projects being advanced on the preferred alternative's project list are already being funded in the East King County sub-area under the Sound Move Phase I program through 2006. Sound Transit estimates that East King County could tap as much as $300 million of their unused Phase I bonding authority and $60 million of unanticipated (excess) sub-area revenues to fund new HCT projects substantially begun or completed by 2006. New HCT projects in the East King County sub-area begun after 2006 could not be funded, however, without a Phase II regional vote. East

King County's total projected Phase II investment capacity, assuming current RTA tax rates are maintained past 2006, is just over $1 Billion for the 2007-2016 period.

Based on state and regional funding sources, approximately $3.5 to 4.0 billion could potentially be available for the first 10 years of the I-405 Corridor Program. The balance of the program cost will be requested from federal and future state, regional, and local funding sources.

Since funding is uncertain, preliminary construction schedules were prepared for implementation based on high, medium, and low funding availability. High and medium funding availability assumes the entire program is funded, with all funds being available within 10 years for the high scenario and 18 years for the medium scenario. High funding availability allows for work to be accomplished concurrently throughout the corridor with construction beginning in 2004 and completed in 10 years. Medium funding availability requires sequential development and an 18-year construction time frame. Limited funding under the low scenario assumes only the hot spots would be funded over a 30-year period.

Projects in the No Action Alternative are currently being developed and funded by the jurisdictions with responsibility. It is anticipated that the No Action projects will be completed within the next six years.

Alternatives 1 and 2 focus on fixed-guideway high-capacity transit. Sound Transit would most likely be lead agency for developing the design and implementation within its Phase II planning. HCT system assumptions are the same for both Alternative 1 and 2. King County and Snohomish County Community Transit would be the leads for implementing increased local bus transit service. For Alternative 2, WSDOT would be lead agency for adding lanes to I-405. Other jurisdiction projects would be the responsibility of the local agencies.

The Preferred Alternative, similar to Alternative 3, provides a mix of solutions that place an emphasis on roadway capacity and bus rapid transit. Alternative 3 proposes the use of a lower-cost bus rapid transit (BRT) system. BRT would use the I-405 HOV lanes and direct access facilities. BRT costs reflect the initial public costs of providing the improvement, and do not include annual maintenance and operation costs. The BRT costs are incorporated into freeway HOV and transit services and park-and-ride costs. WSDOT, Sound Transit, King County, Community Transit, and local agencies would lead implementation of the project elements within their areas of responsibility. Of the estimated $7.6 billion cost of the Preferred Alternative, WSDOT would be the lead for about $5.7 billion. The remainder would be split between transit agencies, cities, and counties.

Alternative 4 is the most costly and primarily focuses on freeway expansion. WSDOT would be lead agency implementing the improvements on I-405 and other state highways.

Mitigation for any specific project impacts is integral to that project and is the prime responsibility of the respective project lead agency. It is expected that agencies will work together as a part of this corridor program to make sure that appropriate and coordinated mitigation measures are implemented.

MAJOR BENEFICIAL AND ADVERSE ENVIRONMENTAL IMPACTS AND MITIGATION

Beneficial Impacts

The proposed I-405 Corridor Program improvements are intended to reduce traffic congestion and improve mobility, reliability, and safety in the corridor compared to the No Action

Alternative. Beyond these operational and transportation benefits, the action alternatives also would yield beneficial impacts that accrue to energy consumption, air emissions, water quality, aquatic habitat, land use, and quality of life.

Improved levels of service and reductions in congestion under each of the action alternatives would result in greater energy efficiency and less fuel consumed per mile traveled compared to the No Action Alternative. Similarly, the action alternatives generally result in slight reductions in emissions of several criteria air pollutants, which could help improve regional air quality.

Where the action alternatives expand or reconstruct existing transportation facilities, opportunities and requirements for retrofitting existing stormwater treatment facilities to higher standards could result in overall improvements to surface water and groundwater quality compared to the No Action Alternative. These improvements, combined with removal of existing barriers to fish passage and implementation of stream improvements, would benefit aquatic habitat and endangered fish species.

In comparison to the No Action Alternative, the action alternatives would support planned growth and development within the designated Urban Growth Area (UGA) and within the more urbanized activity centers of the study area. This would be consistent with Puget Sound Regional Council's *VISION 2020* and *Destination 2030*, and the adopted land use plans of local jurisdictions. Growth focused within the UGA would be accompanied by a commensurate reduction in cumulative pressure for development outside the UGA in rural areas that often are more environmentally sensitive and less well equipped to accommodate substantial growth and development.

Adverse Impacts

A variety of potential adverse environmental effects have been identified. This EIS has identified adverse impacts that are anticipated to occur as a result of the proposed program alternatives to the extent feasible at a programmatic level of detail. Some of these impacts may be considered to be significant or substantial and will also be analyzed at a later time during project-level environmental analysis, documentation, and review. Potential mitigation has been identified in the Final EIS to address these adverse impacts, generally at a planning level of detail commensurate with the degree of definition for the program alternatives. The details of such mitigation will need to await further project design and future project-level NEPA and SEPA environmental analysis, documentation, and review.

It is not possible to determine at the programmatic level of analysis for this EIS if mitigation would reduce all identified adverse impacts to an insignificant level. However, the lead agencies intend to implement sufficient mitigation to accomplish this. The conclusion of whether there would be significant or substantial adverse impacts remaining after mitigation has been reassessed for the Final EIS based upon public and agency comments on the Draft EIS. No new significant impacts were identified based on public and agency comments or added analyses conducted as part of the Final EIS. This conclusion will be assessed again within the context of individual project actions during project-level environmental analysis, documentation, and review.

Figures S-2A, S-2B, S-2C, and S-2D show the effects of the No Action Alternative, the four DEIS action alternatives, and the Preferred Alternative (PA) before implementation of mitigation measures. These figures follow page S - 20. The Table S-2 environmental matrix summarizes the effects of the alternatives. Table S-2 follows Figure S-2D. Possible mitigation measures that could be implemented to avoid or reduce impacts are also presented in the matrix.

AREAS OF CONCERN

Endangered Species Act and Listed Fish Species

The I-405 Corridor Program has benefited from early and ongoing participation by the National Marine Fisheries Service, U.S. Fish and Wildlife Service, Washington State Department of Fish and Wildlife, and other federal and state resource agencies. Nonetheless, substantial issues and concerns remain regarding potential effects of the proposed action and alternatives on water quality, water quantity, habitat for endangered chinook salmon, and compliance with requirements of the Endangered Species Act.

High-Capacity Transit (HCT) System Definition

The I-405 Corridor Program conducted a sensitivity test of different transit service levels and operating characteristics of the proposed physically separated, fixed-guideway HCT system in Alternatives 1 and 2. The I-405 Corridor Program Executive, Steering, and Citizen committees did not recommend one set of operating characteristics or technology as being most appropriate for implementation in the corridor. Choice of a different technology, operating concept, or alignment from that assumed could have a substantial effect on system performance and on many environmental impacts.

Regional Transportation Pricing

The I-405 Corridor Program incorporated the results of an ongoing regional pricing study being conducted by the Puget Sound Regional Council (PSRC). The results to date have been inconclusive regarding overall costs and benefits of a transportation pricing program. The I-405 Corridor Program committees have recommended consideration of tolls or other pricing mechanisms as part of any regional pricing strategy that might be considered by PSRC.

Level of 2020 Congestion Relief

The I-405 Corridor Program study results indicate that several of the action alternatives would substantially improve congestion in year 2020 compared to the No Action Alternative; however, none of the action alternatives would substantially improve congestion on roads other than I-405 in 2020 compared with current levels. This finding has caused substantial concern and discussion within the I-405 Corridor Program committees.

Trans-Lake Washington Project

The ongoing Trans-Lake Project is examining several transportation improvements that influence or overlap with I-405 improvements. Examples of overlapping issues include the design of the I-405/SR 520 interchange and the interface with cross-lake transit improvements. Some of these issues will be resolved in the Trans-Lake Project, while others will be addressed in subsequent studies, including future project-level environmental analysis, documentation, and review for the I-405 Corridor Program improvements.

RESOLUTION OF ONGOING ISSUES

Air Quality Conformity

Air quality conformity is demonstrated by showing that a project would not cause or contribute to any new violation of any national ambient air quality standard (NAAQS), would not increase the frequency or severity of any existing violation of any NAAQS, and would not delay timely

attainment of the NAAQS. An air quality conformity determination has been issued for the proposed transportation system improvements contained in the Preferred Alternative, and the Preferred Alternative's system improvements have been adopted by the PSRC into the conforming *Destination 2030*, Metropolitan Transportation Plan and Transportation Improvement Program. Please refer to Section 3.1. Nonetheless, the conformity of individual elements included in the action alternatives cannot be determined at this time because project-level transportation data and design information are not available; therefore, project-level air quality analysis will be needed at a later time for those individual elements that are not exempt from project-level conformity analysis.

Aquatic Habitat Enhancements

The I-405 Corridor Program proposes to place special emphasis on identification of specific concepts and locations for aquatic habitat enhancements and mitigation. Opportunities for potential "early action" strategies that could be initiated prior to or during early project development have also been developed. WSDOT is exploring these potential measures through ongoing coordination with federal, state, and local agencies. Please refer to Appendix J, Corridor Environmental Program, for a summary of these early action strategies and other potential approaches to corridor mitigation and enhancement.

Retrofits of Existing Stormwater Treatment Facilities

In connection with the aquatic habitat enhancements discussed previously, the I-405 Corridor Program also proposes to retrofit and upgrade existing stormwater detention and treatment facilities along I-405 that would be affected by new construction. The I-405 Corridor Program is currently exploring these opportunities through ongoing coordination with federal, state, and local agencies. Please refer to Appendix J, Corridor Environmental Program, for a summary of these and other potential approaches to corridor mitigation and enhancement.

Transportation Demand Management (TDM) Effects

The I-405 Corridor Program studied inclusion of a TDM program within the I-405 corridor. The empirical estimates of the TDM program's effectiveness were included in the documentation of impacts on travel demand within the study area. These effects could not be fully integrated into all of the transportation results due to limitations in the travel forecasting procedures. The Puget Sound Regional Council is conducting additional research to include more TDM effects into future versions of the model. Research to date suggests that the expanded program contained in the Preferred Alternative represents one of the most extensive corridor-based demand management and trip reduction programs anywhere in the United States.

High-Occupancy Vehicle (HOV) Demand

The traffic forecasts prepared for the I-405 Corridor Program provided a breakdown of travel demand by mode and trip purpose (i.e., transit, HOV 3+ occupancy work-related, HOV 3+ occupancy non-work, HOV 2-person occupancy, etc.). Additional analysis was conducted to validate the HOV components of the forecasts. Projected HOV volumes were examined along the length of I-405. Overall, the forecasts of HOV 3+ volumes were considered to be reasonable in proportion to total volumes in the corridor.

Transit Service Levels

The I-405 Corridor Program analyzed specific changes in transit service hours associated with each alternative. These assumptions were further analyzed prior to selecting the Preferred Alternative in the Final EIS. The Preferred Alternative proposes to expand local and regional bus service by upwards of 75 percent in the study area, with phasing to be determined by the relevant transit agencies serving the I-405 Corridor, e.g., King County and Sound Transit.

HCT Alignment

The I-405 Corridor Program analyzed a specific corridor alignment for physically separated, fixed-guideway HCT (Alternatives 1 and 2) and bus rapid transit operating on improved-access HOV lanes (Alternative 3). These alignments reflected the results of previous corridor planning efforts and the best judgment of the project leads and implementing agencies. Assumptions were made regarding fixed-guideway HCT segments that would be elevated, at-grade, or underground. Further analysis was conducted to refine these alignment assumptions prior to identifying the Preferred Alternative in the Final EIS. The Preferred Alternative proposes a bus rapid transit system throughout the I-405 corridor with appropriate east-west connections to Redmond and Issaquah. This system would consist of express buses operating in improved-access HOV lanes on I-405, I-90, and SR 520.

Lane Balance

The initial I-405 Corridor Program analyses assumed that any additional lanes proposed for I-405 as part of an alternative would be added throughout the entire length of the facility. The project proponents have refined the actual number of lanes that are warranted for different sections of the freeway to account for balancing of lanes with demand and operational characteristics within the Preferred Alternative. This balancing will account for physical and operational constraints, as well as changes in traffic demand that occur along the 30-mile corridor.

Express Lanes in Alternative 4

The proposed express lanes in Alternative 4 were sited within the corridor to maximize use and provide reasonable alignments. A limited number of access points was assumed. Revision of the assumed alignment and number and location of assumed access points would likely occur during more detailed design and environmental analysis, documentation, and review if the express lanes were proposed for implementation in the future. Express lanes are not included in the Preferred Alternative.

Managed Lanes

The I-405 Corridor Program has considered the issues around possible operation of one or more lanes within the I-405 freeway as an access-managed or high-occupancy/toll (HOT) facility. The potential effects of creating a managed lane facility, including pricing effects, revenues, equity, access, operation, and other potential issues, have not been studied in detail . Thus, the I-405 Corridor Program committees have recommended that managed lanes be considered further only after more detailed studies and policy considerations have been accomplished outside of the I-405 Corridor Program EIS. Management of lanes beyond retention of the existing HOV system and intelligent transportation system installations is not included in the Preferred Alternative.

Freeway Lids or Other Enhancements

Several freeway impact mitigations and enhancements were included for each action alternative in the preliminary designs and project cost estimates. Subsequent discussions with local agencies have raised the potential for design of freeway lids as noise mitigation or to replace impacted amenities and connectivity within the local community. These issues and opportunities were reviewed in preparation for selecting the Preferred Alternative in the Final EIS. Freeway lids are not included as part of the transportation improvements contained in the Preferred Alternative.

OTHER ACTIONS LIKELY TO BE REQUIRED FOR IMPLEMENTATION

Further NEPA and SEPA environmental analysis, documentation, and review will be conducted to enable decisions regarding site-specific, project-level details on alignments, high-capacity transit technology, project impacts, costs, and mitigation measures. In addition, a number of regulatory permits and approvals will be required prior to construction of many of the proposed transportation improvements. Because this is a programmatic evaluation, the permit application and review process will occur when individual projects are ready to be advanced for design and construction. The project leads will apply for permits and approvals for individual projects considered under this EIS when design has progressed sufficiently to provide the information required by the permitting agencies. Additional coordination with resource and permitting agencies will occur at that time to provide feedback on the individual projects as they are implemented.

Permits and approvals that may be required, and the responsible regulatory agencies include the following:

Federal

- U.S. Army Corps of Engineers – discharge of dredged or fill material into waters of the United States (Section 404 of Clean Water Act); certain work or structures in navigable waterways (Section 10 of Rivers and Harbors Act)
- Federal Aviation Administration – Highway Clearance for airspace intrusion of highway facility
- National Marine Fisheries Service – Endangered Species Act Section 7 Consultation
- U.S. Fish and Wildlife Service – Endangered Species Act Section 7 Consultation
- Federal Highway Administration and Federal Transit Administration – Section 4(f) of the Department of Transportation Act, review required when public parks, recreation areas, wildlife and waterfowl refuges, or any significant historic or archaeological sites of national, state, or local significance will be impacted
- U.S. Environmental Protection Agency – Oversight on Section 404 of the Clean Water Act; Air Conformity, NEPA review responsibilities per Section 309 of the Clean Air Act; oversight responsibility on stormwater permits, National Pollutant Discharge and Elimination Systems (NPDES) Permits
- U.S. Environmental Protection Agency/King County/Snohomish County/Renton – Sole Source Aquifer approval for any activity that may affect an aquifer recharge zone

State

- Washington State Department of Ecology – Section 401 Water Quality Certification and Short-term Modification of Water Quality Standards for discharges into state waters
- Washington State Department of Ecology – National Pollutant Discharge Elimination System (NPDES) Baseline General Permit to Discharge Stormwater Associated with Construction Activity when disturbing 5 or more acres during construction and resulting in discharge of pollutants into state waters; Municipal Stormwater Permit for stormwater discharges into state waters
- Washington State Department of Fish and Wildlife – Hydraulic Project Approval for work that affects the bed and flow of state waters
- Washington State Office of Archaeology and Historic Preservation – Archaeological Approval under Section 106 of the National Historic Preservation Act of 1966 to ensure that activities do not affect any known historic or culturally significant sites. Local cultural and historic evaluation also is required.

Regional and Local

- Puget Sound Clean Air Agency – Asbestos removal permits for removal of asbestos-containing materials from structures
- King and Snohomish counties and local jurisdictions – Shoreline permits for work in shoreline zones
- King and Snohomish counties and local jurisdictions – Floodplain permits for work in designated floodplains
- King and Snohomish counties and local jurisdictions – Underground storage tank removal permits for removal or abandonment of any underground storage tanks

This is a preliminary list of permits and approvals for the range of proposed improvements contained in the I-405 Corridor Program. In addition to these permits, the lead agencies have various memoranda of agreement with federal, state, and local jurisdictions that cover activities relating to the construction and maintenance of transportation infrastructure and related facilities. WSDOT also may execute purchase or easement agreements with local jurisdictions and private land owners for additional right-of-way.

Local shoreline and critical areas ordinance reviews, and associated permits and approvals, will be obtained as necessary.

MITIGATION COMMITMENTS

Mitigation for any specific project impacts is integral to that project and is the prime responsibility of the respective project lead agency. It is expected that agencies will work together as a part of this corridor program to make sure that appropriate and coordinated mitigation measures are implemented.

Possible mitigation measures for potential impacts associated with the action alternatives are summarized in Table S-2 and are described at the end of most subsections describing the elements of the affected environment in Chapter 3. Appendix J, Corridor Environmental Program, contains a summary of early-action strategies and other potential approaches to corridor mitigation and enhancement. The I-405 Corridor Program does not include site-specific

or project-level mitigation commitments because of its program level of design and analysis. Detailed mitigation will be the focus of subsequent environmental analysis, documentation, and review when project-level design, project footprints, and construction information will be available.

RELATED ACTIONS BY OTHER GOVERNMENTAL AGENCIES IN THE CORRIDOR

There are several ongoing corridor studies, pending projects, and government actions that overlap the I-405 Corridor Program study area or are related to implementation of the Corridor Program. These are described briefly below by the initiating government or agency. In addition, the relationship of the Corridor Program to study area plans and policies is discussed in Section 3.13, Land Use, of this EIS.

Washington State Department of Transportation

Trans-Lake Washington Project: This project-level EIS seeks to identify a set of reasonable and feasible multimodal solutions for improving traffic mobility across Lake Washington. There is substantial overlap of the study areas and inter-relationships among alternative transportation improvements proposed as part of the Trans-Lake Washington Project and the I-405 Corridor Program, such as the selection of transit technologies and design of the I-405/ SR 520 interchange.

SR 522 Multimodal Project: This project contains a range of transportation improvements to improve safety and people-carrying capacity on SR 522 between I-5 and I-405.

Sound Transit

Sound Move: Sound Move is Sound Transit's 10-year implementation plan for high-capacity transit (HCT) and supporting facilities. Sound Transit Regional Express implements the Sound Move program for bus and high-occupancy vehicle (HOV) transit facility enhancements in the I-405 corridor, including developing transit and HOV direct access connections to I-405 in Renton, Bellevue, Kirkland, and Bothell.

Sound Transit – Future Investments: Sound Transit began Phase II planning in mid-2001 and expects technical work to continue over several years to enable a Phase II public vote. A Phase II public vote is necessary to build a new set of proposed regional HCT improvements beyond 2006. Assuming a positive vote outcome, the plan would provide additional (but as yet unspecified) HCT facilities and services to east King County, including jurisdictions within the I-405 corridor. The I-405 Corridor Program FEIS is a programmatic source of potential HCT-related projects to be included in a future Phase II implementation plan proposal.

King County

Regional Arterial Network (RAN): This is King County's assessment of the National Highway System, state routes, and principal arterials. Its purpose is to identify effective roadway and transit improvements designed to move people and goods safely and efficiently from community to community along regionally significant arterials within King County. Some of the highway and transit improvements contained in the I-405 Corridor Program Preferred Alternative are RAN priorities, or will be included in the RAN.

OVERVIEW OF THE EIS

This Final EIS summarizes the public involvement during the Draft EIS review period, discusses substantive comments received on the Draft EIS, and provides responses to those comments (see Volume 2). In addition, this Final EIS identifies the Preferred Alternative and corridor mitigation program, and describes the basis for its selection.

This Final Environmental Impact Statement consists of 11 chapters (Volume 1), responses to comments received on the Draft EIS (Volume 2), and several appendices (Volume 3) with supporting data. Important chapters and information include:

1. **Purpose and Need for Action:** This chapter presents an overview of the goals of the program.
2. **Description of Alternatives:** This section provides descriptions of the Preferred Alternative and the five Draft EIS alternatives evaluated in Chapter 3.
3. **Affected Environment and Environmental Consequences:** This chapter is subdivided into the 22 major elements of the affected environment. Under each element is a description of the existing condition, the analysis methodology, the results of the analysis, and potential mitigation measures. In addition, impacts are discussed in several places:

    - Direct impacts are discussed under each element of the Affected Environment. These are effects that have a straightforward cause-and-effect relationship to the programmatic action.
    - Secondary, or indirect impacts are reasonably foreseeable effects of an action that occur later in time or are further removed in distance from the direct effects of the proposal. Secondary impacts are discussed along with cumulative effects in Section 3.23.
    - Cumulative effects are the incremental or additive effects of the programmatic action in conjunction with other past, present, and future reasonably foreseeable actions, regardless of what agency or person undertakes such other actions. Cumulative effects are discussed along with secondary impacts in Section 3.23 for the scoped critical resources, including air quality, energy, surface water, wetlands, fish and aquatic habitat, and farmlands.

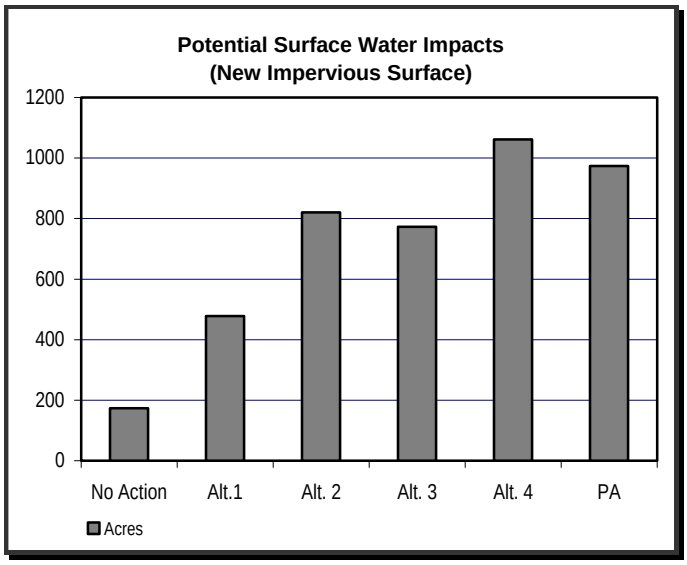
All of the comments received on the Draft EIS are presented in a table in Volume 2, along with responses and clarifications.

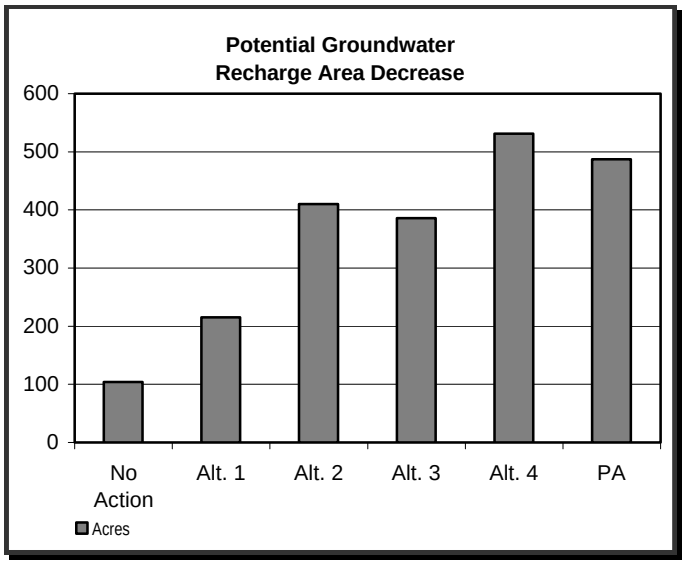
TIMING

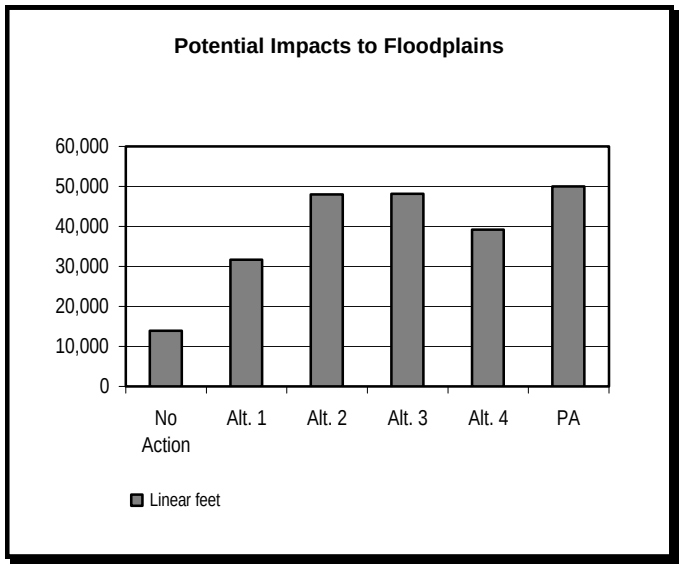
The Draft EIS was issued for circulation and review on August 17, 2001. Public hearings were held for public and agency review and comment on September 18, 19, and 20, 2001. The period for receipt of public and agency comments was extended 16 days to October 24, 2001.

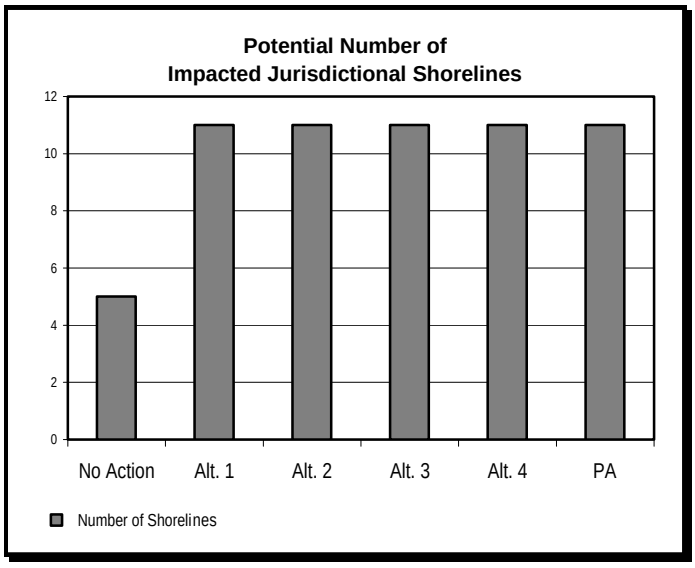
The following tables are a graphic representation of the relative effects of the alternatives. They are intended to give the reader an alternative means of viewing quantifiable impacts. Details of the information represented here can be found in the text.

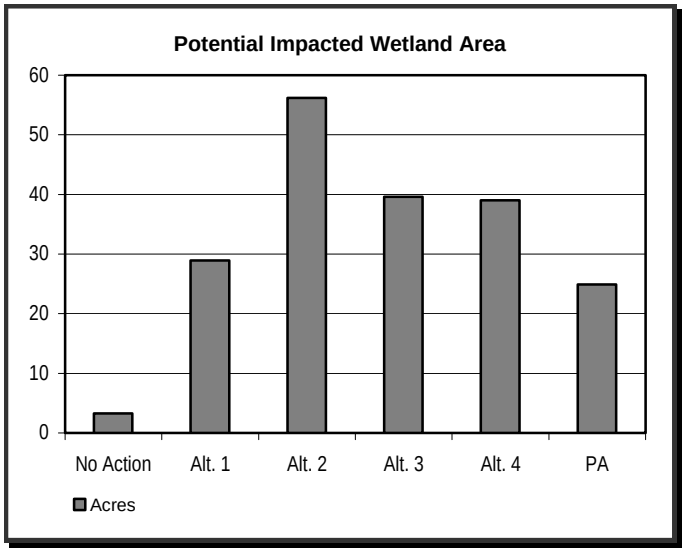
Figure S2-A: Summary by Alternative of Effects Without Mitigation











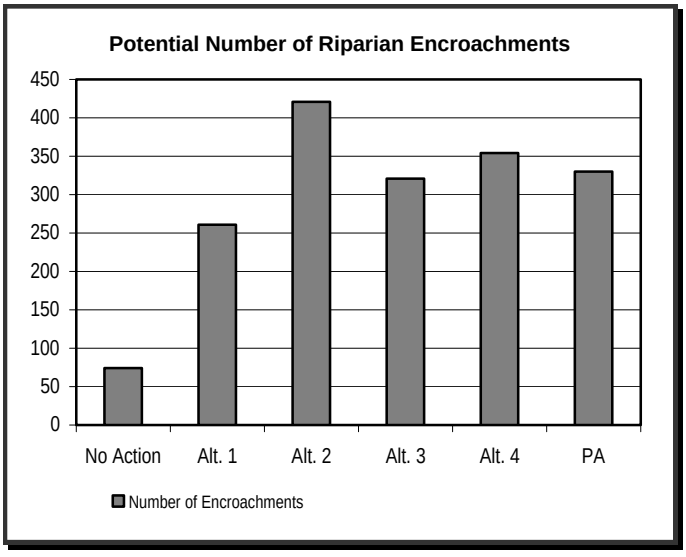
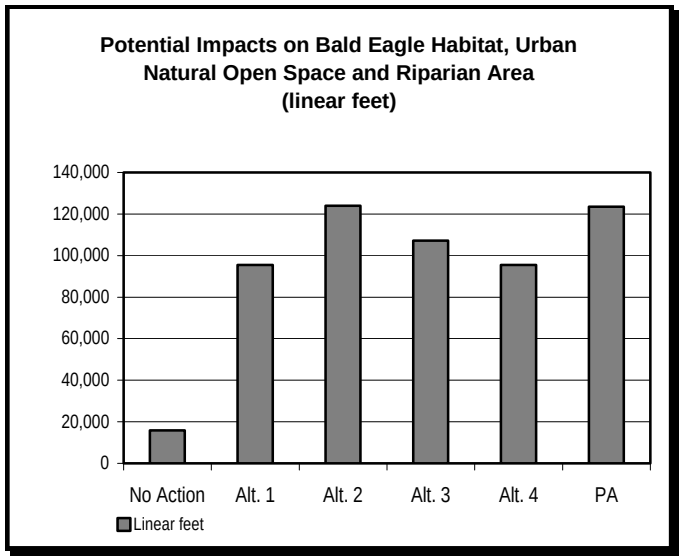
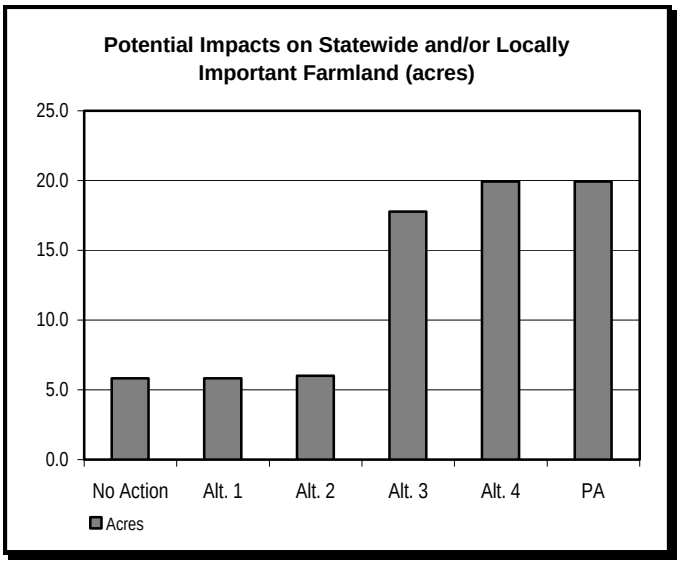
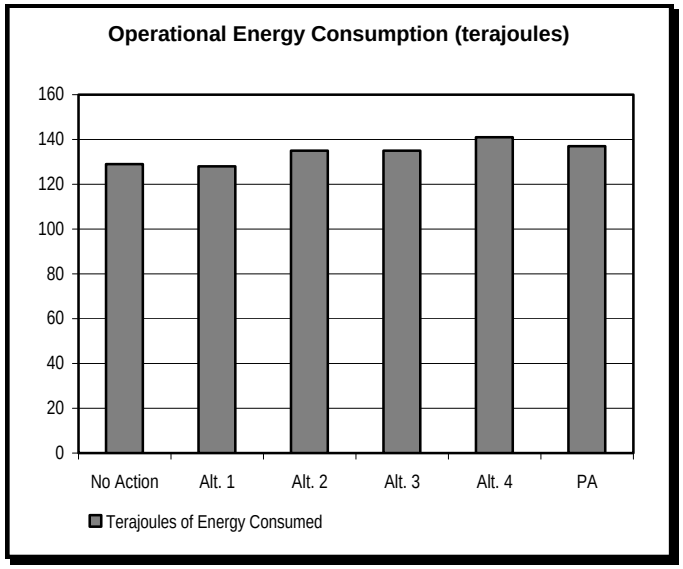
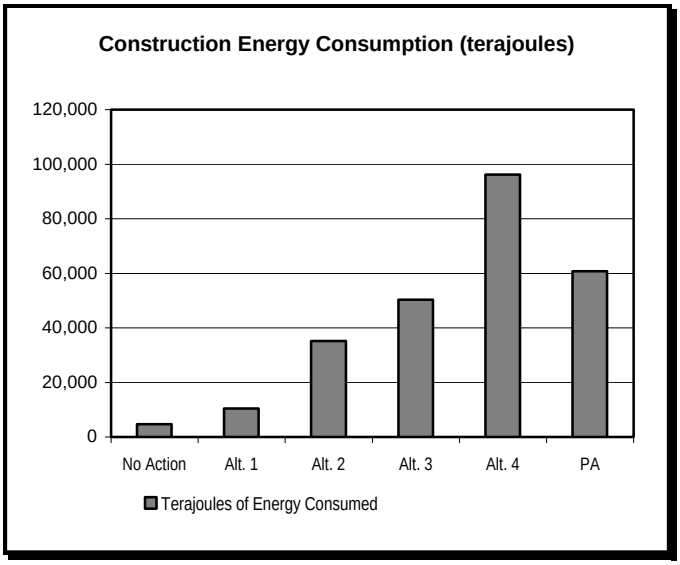


Figure S2-B: Summary by Alternative of Effects Without Mitigation









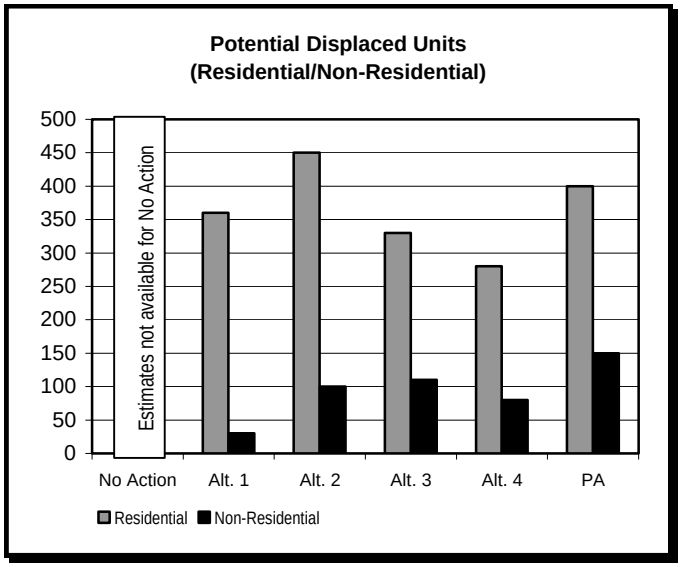
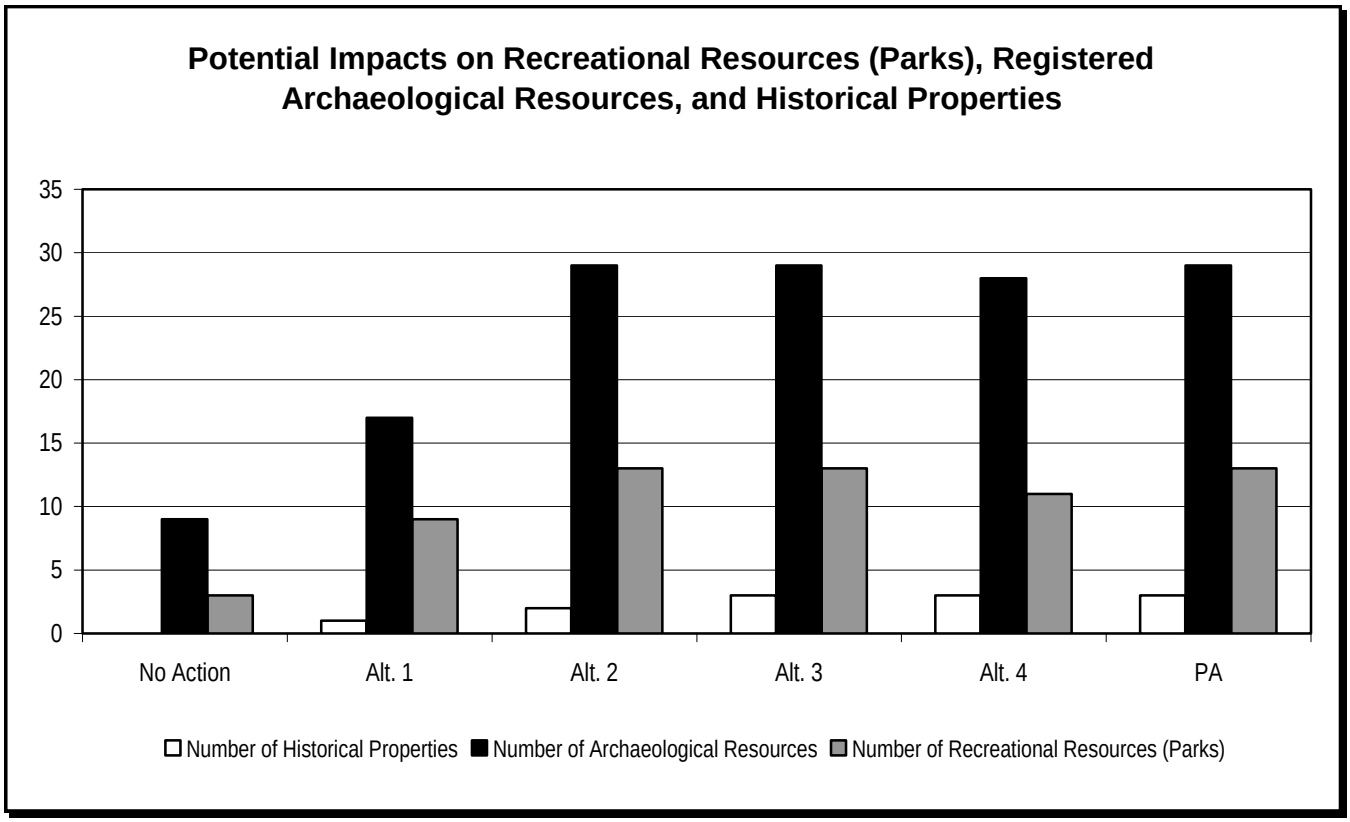


Figure S2-C: Summary by Alternative of Effects Without Mitigation



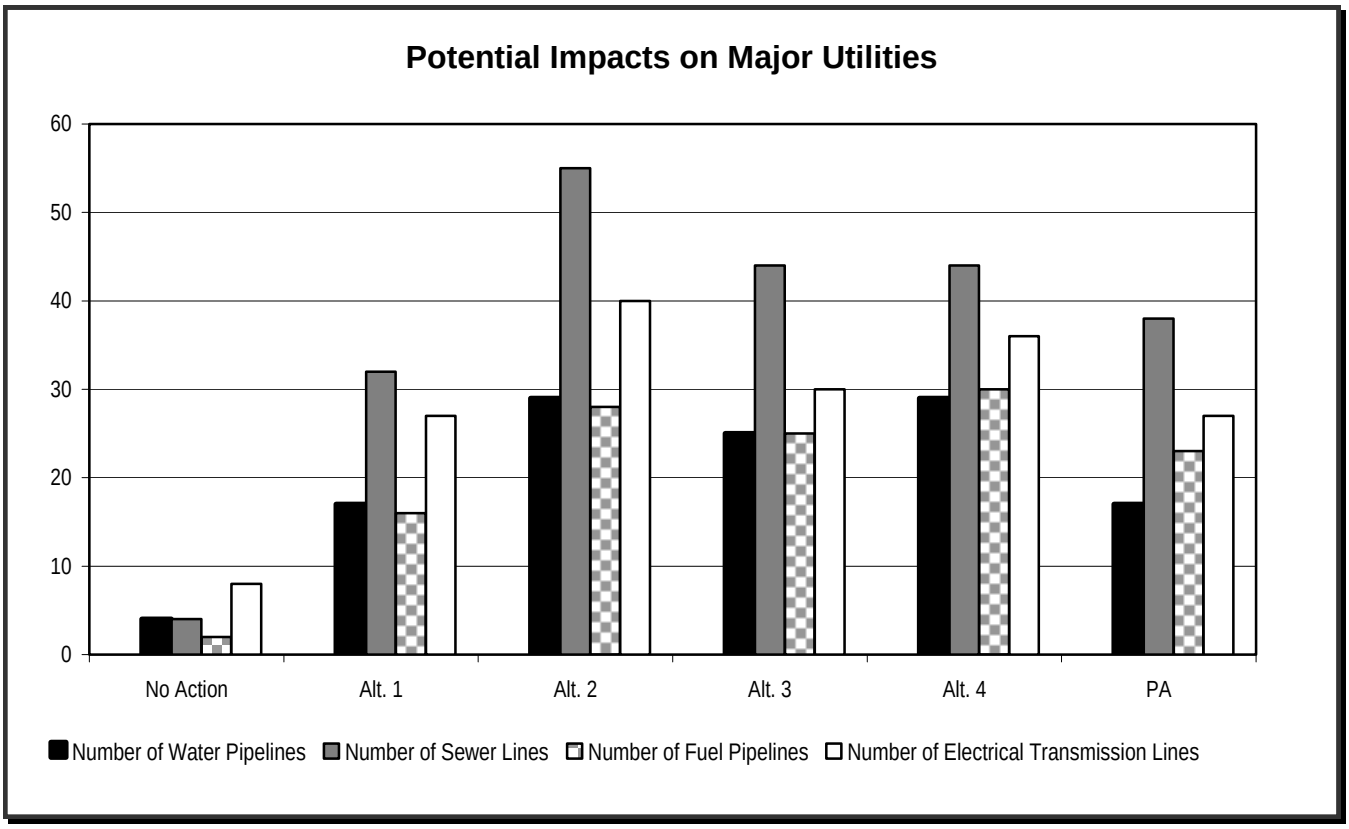
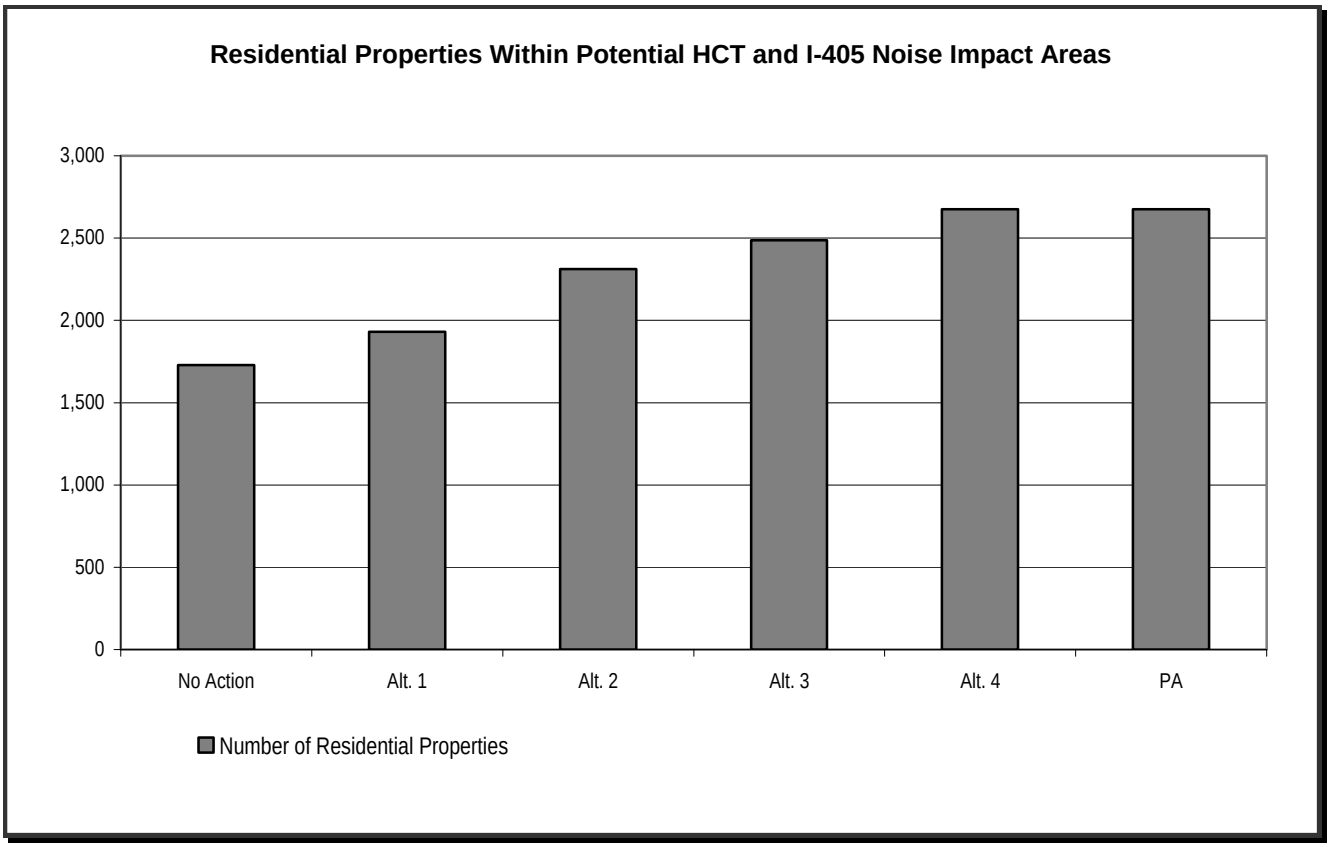


Figure S2-D: Summary by Alternative of Effects Without Mitigation



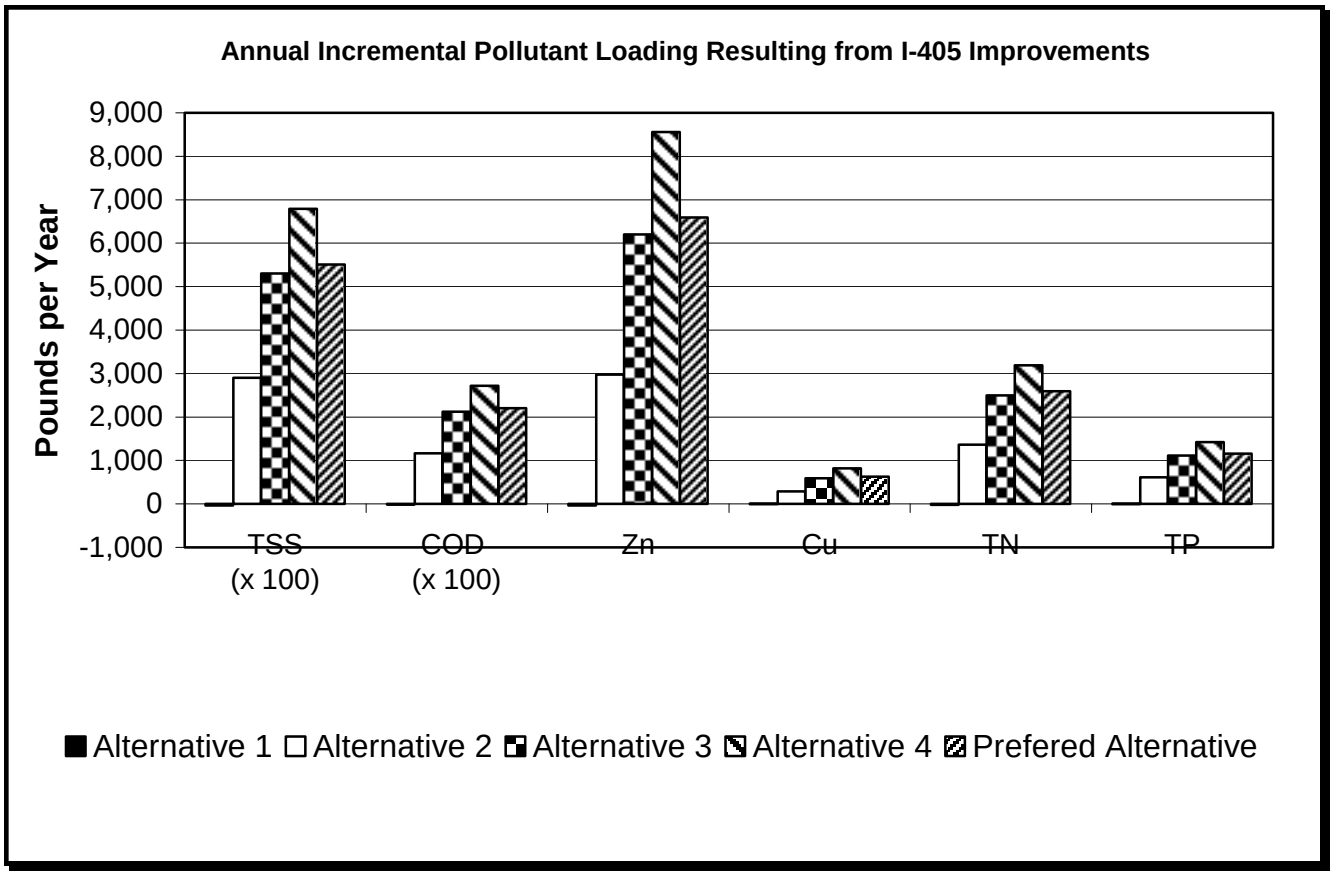


Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Section 3.1 Air Quality No Action Alternative	Construction of projects under the No Action Alternative would include temporary air pollutant emissions, including dust and combustion emissions. Regional transportation air pollutant emissions modeled for 2020 under the No Action Alternative were modeled to be slightly greater than those modeled for the 1998 MTP Plan update. The daily emission values of 1,315 metric tons CO, 143 metric tons HC, and 182 metric tons NO_x are within the region's SIP budget.	Because the No Action Alternative does not include construction beyond the baseline projects, it would not require mitigation beyond that incorporated into the baseline projects.
Alternative 1	Alternative 1 would include construction activities throughout the I-405 study area. Particulate emissions (fugitive dust) from construction activities would be noticeable near construction sites if uncontrolled. Heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO and NO_x in exhaust emissions. Some phases of construction, particularly paving operations if asphalt is used, would result in short-term odors. Regional transportation air pollutant emissions modeled for 2020 for operation of Alternative 1 were modeled to be slightly less than for the No Action Alternative. The daily emission values of 1,313 metric tons CO, 143 metric tons HC, and 182 metric tons NO_x are within the region's SIP budget.	Particulate emissions (in the form of fugitive dust during construction activities) are regulated by PSCAA. Any emission of fugitive dust requires best available control technology. Construction impacts would be reduced by incorporating mitigation measures into the construction specifications for the improvements. The following measures to control PM_{10}, deposition of particulate matter, and emissions of CO and NO_x during construction could be used: • Spraying exposed soil with water would reduce emissions of PM_{10} and deposition of particulate matter. • Covering all trucks transporting materials, wetting materials in trucks, or providing adequate freeboard (space from the top of the material to the top of the truck) would reduce PM_{10} and deposition of particulates during transportation. • Providing wheel washers to remove particulate matter that would otherwise be carried off-site by vehicles would decrease deposition of particulate matter on area roadways. • Removing particulate matter deposited on paved, public roads would reduce mud and dust on area roadways. • Covering dirt, gravel, and debris piles as needed would reduce dust and wind-blown debris. • Routing and scheduling construction trucks so as to reduce delays to traffic during peak travel times would reduce secondary air quality impacts caused by a reduction in traffic speeds while waiting for construction trucks. • Requiring appropriate emission-control devices on all construction equipment powered by gasoline or diesel fuel would reduce CO and NO_x emissions in vehicular exhaust. Using relatively new, well-maintained equipment would reduce CO and NO_x emissions.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		• Staging of construction between separate projects to minimize overall system congestion and delays would reduce regional emissions of pollutants during construction. • Other measures may be considered as appropriate. Because emissions associated with operation of the action alternatives are expected to be within SIP emission budgets, no substantial adverse air quality impacts are expected to result from the alternatives and no mitigation measures would be required.
Alternative 2	Construction impacts would be similar to Alternative 1; however, Alternative 2 would include additional construction to I-405 as well as construction of a high-capacity transit system. Regional transportation air pollutant emissions modeled for 2020 for Alternative 2 were modeled to be slightly less than for the No Action Alternative and Alternative 1 for CO and slightly higher for NOx. The daily emission values of 1,302 metric tons CO, 143 metric tons HC, and 184 metric tons NOx are within the region's SIP budget values.	Same as Alternative 1.
Alternative 3	Construction impacts would be similar to Alternatives 1 and 2; however, Alternative 3 would include substantial construction to I-405, but not include any new high-capacity transit system construction. Regional transportation air pollutant emissions modeled for 2020 for Alternative 3 were modeled to be slightly less than for the No Action Alternative and Alternative 1 for CO and slightly higher for NO_x. The daily emission values of 1,294 metric tons CO, 142 metric tons HC, and 186 metric tons NO_x are within the region's SIP budget values.	Same as Alternative 1.
Alternative 4	Construction impacts would be similar to Alternative 3; however, Alternative 4 would include a greater amount of construction within the I-405 corridor. Regional transportation air pollutant emissions modeled for 2020 for Alternative 4 were modeled to be less than for the other alternatives. The daily emission values of 1,256 metric tons CO, 139 metric tons HC, and 181 metric tons NO_x are within the region's SIP budget.	Same as Alternative 1.
Preferred Alternative	Construction impacts would be between those of Alternatives 3 and 4 because the Preferred Alternative would include a greater amount of construction within the I-405 corridor than Alternative 3, but less than Alternative 4. Regional transportation air pollutant emissions for 2020 for the Preferred Alternative would range between the values for Alternatives 3 and 4 because the Preferred Alternative is generally similar to Alternative 3, but includes additional project aspects from Alternative 4.	Same as Alternative 1.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Section 3.2 Noise		
No Action Alternative	The No Action Alternative includes construction of baseline projects which would generate noise independent of the I-405 Corridor Program and would be addressed through the environmental analysis, documentation, and review completed for those projects. For the length of the I-405 corridor, there are 1,729 residential properties within the potential impact area under the No Action Alternative in 2020. This figure represents a 24 percent increase in the number of potentially noise-affected residential parcels relative to existing conditions in the I-405 corridor.	Mitigation for the No Action Alternative projects would be addressed through the environmental analysis, documentation and review completed for those projects. WSDOT has been completing a Type II barrier program (retrofit program) for the corridor based on funding availability. Completion of the program would reduce noise levels along I-405 in areas not currently protected by barriers.
Alternative 1	Construction noise would be intermittent, occurring seasonally during an approximately two-year construction period. Maximum noise levels of construction equipment under all action alternatives would be similar to typical maximum construction equipment noise levels and would range from 69 to 106 dBA at 50 feet (15 meters). Construction noise at residences farther away would decrease. In the study area, there are 1,931 residential properties within the potential impact areas for traffic and transit noise under Alternative 1 in 2020. This figure represents a 12 percent increase in the number of residential parcels potentially affected by noise relative to the No Action Alternative, and a 38 percent increase relative to existing conditions.	Construction noise could be reduced by using enclosures or walls to surround noisy equipment, installing mufflers on engines, substituting quieter equipment or construction methods, minimizing time of operation, and locating equipment farther from sensitive receptors. Noise impacts from long-term operation of the improvements can be reduced by applying traffic management measures, acquiring land as buffer zones, realigning the facility, installing noise insulation in public use or nonprofit institutional structures, and constructing noise barriers or berms. Mitigation costs to address the long term noise impacts due to new transportation improvements will come from project dollars. Currently, there are noise barriers along much of the I-405 corridor. Completion of barriers to address existing noise impacts along I-405 in areas that are reasonable and feasible is dependent on funding being provided by the state legislature. Those barriers would continue to reduce noise levels along I-405 relative to the noise levels projected in this report. Barriers may also be useful along parts of the high-capacity transit corridor.
Alternative 2	Construction impacts under Alternative 2 would be similar to Alternative 1. There would be slightly more construction noise associated with I-405 under Alternative 2 than Alternative 1. There are 2,311 residential properties within the potential impact areas for traffic and transit noise under Alternative 2 in 2020. This figure represents a 34 percent increase in the number of residential parcels potentially affected by noise relative to the No Action Alternative and a 66 percent increase relative to existing conditions.	Same as Alternative 1.

Table S-2:
Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Alternative 3	Construction impacts under Alternative 3 would be similar to Alternatives 1 and 2. There would be more construction noise associated with construction of additional roadway capacity in the I-405 corridor under Alternative 3 than Alternatives 1 and 2; however, there would be no construction in the BNSF right-of-way. Alternative 3 would not include a fixed-guideway high-capacity transit component; therefore, there would be no additional operational noise impacts in the BNSF alignment. There are 2,486 residential properties within the potential impact areas for traffic noise under Alternative 3 in 2020. This figure represents a 44 percent increase in the number of residential parcels potentially affected by traffic noise relative to the No Action Alternative and a 78 percent increase relative to existing conditions.	Same as Alternative 1.
Alternative 4	Construction impacts under Alternative 4 would be similar to those described for the other action alternatives. There would be more construction noise in the I-405 corridor under Alternative 4 than any of the other alternatives because of construction of the express facility. Alternative 4 would not include a fixed-guideway high-capacity transit component or BRT system; therefore, there would be no noise impacts associated with these systems. There are 2,675 residential properties within the potential impact areas for traffic noise under Alternative 4 in 2020. This figure represents a 55 percent increase in the number of residential parcels potentially affected by traffic noise relative to the No Action Alternative and a 92 percent increase relative to existing conditions.	Same as Alternative 1.
Preferred Alternative	Construction impacts under the Preferred Alternative would be similar to those described for the other action alternatives. There would be more construction noise in the I-405 corridor under the Preferred Alternative than under Alternative 3, but less than for Alternative 4. The Preferred Alternative would be the same as Alternative 3 along much of the corridor, but would include additional capacity in the Renton to Bellevue area; therefore, it would have greater potential for noise impact in that area. The Preferred Alternative would not include a fixed-guideway high-capacity transit component; therefore, there would be no noise impacts associated with these types of systems. There are 2,675 residential properties within the potential impact areas for traffic noise under the Preferred Alternative in 2020. This figure represents a 55 percent increase in the number of residential parcels potentially affected by traffic noise relative to the No Action Alternative, and a 92 percent increase relative to existing conditions.	Same as Alternative 1.
Section 3.3 Energy and Natural Resources No Action Alternative	An estimated 4,700 terajoules of energy would be consumed during construction of the No Action Alternative. The energy expended for construction under the No Action Alternative would be substantially less than that for any of the action alternatives because of the comparatively smaller amount of construction that would occur. Operational energy consumption for the No Action Alternative improvements would be 129 terajoules.	The No Action Alternative would not include construction or add vehicle capacity beyond baseline projects, and therefore no mitigation would be required. Measures to reduce energy consumption during construction could include limiting the idling of construction equipment and employee vehicles, encouraging carpooling or van pools among

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		construction workers, and locating construction staging areas as close as possible to work sites. Any transportation control measures to reduce traffic volumes and congestion would also decrease energy consumption.
Alternative 1	An estimated 10,390 terajoules of energy would be consumed during construction of Alternative 1. Operational energy consumption would be 1 percent less than the No Action Alternative for Alternative 1.	Because no substantial impacts relative to No Action are expected under any of the action alternatives, no mitigation would be required.
Alternative 2	An estimated 35,190 terajoules of energy would be consumed during construction of Alternative 2. Operational energy consumption would be 5 percent greater than the No Action Alternative.	Same as Alternative 1.
Alternative 3	An estimated 50,300 terajoules of energy would be consumed during construction of Alternative 3. Operational energy consumption would be 5 percent greater than the No Action Alternative for Alternative 3.	Same as Alternative 1.
Alternative 4	An estimated 96,200 terajoules of energy would be consumed during construction of Alternative 4. Operational energy consumption would be 9 percent greater than the No Action Alternative for Alternative 4.	Same as Alternative 1.
Preferred Alternative	An estimated 60,800 terajoules of energy would be consumed during construction of the Preferred Alternative. Operational energy consumption would be 6 percent greater than the No Action Alternative for the Preferred Alternative.	Same as Alternative 1.
Section 3.4 Geology and Soils No Action Alternative	In order to construct the proposed facilities, the topography would be altered, soils would be disturbed, and impervious surface would be added. The No Action Alternative has the lowest magnitude of erosion, landslide, seismic, and soft ground hazards of any I-405 Corridor Program alternative. Mine hazards are anticipated to be low. The risk of unmitigatable operational impacts due to locating facilities in erosion hazard areas is rated medium for the No Action Alternative. Volcanic hazards are anticipated to be low.	Design solutions including realignment and relocation of improvements will be considered to avoid, minimize, or mitigate disturbance to geologic hazard areas. Construction: Erosion: Best management practices (BMPs) to reduce erosion and sedimentation during construction include dry-season construction, re-establishing vegetation before the rainy season, mulching or applying erosion control blankets, and careful management of runoff to keep water off bare slopes and limit flow velocities. Silt fences, ditch check dams, and sedimentation ponds are among the BMPs used to remove

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		sediment from runoff. King County and many local jurisdictions require use of these BMPs as part of the permitting process. Additional BMPs, especially related to construction timing, could be instituted since many of the erosion hazard areas are adjacent to or upstream from chinook salmon habitat. Landslide: Facilities in landslide hazard areas can usually be designed to be safely constructed and operated. Temporary cuts through landslide-prone materials could be limited in height or avoided, requiring the use of special retaining wall systems for earth retention. Walls could be designed for higher lateral pressures to limit soil movement. Subsurface drainage may be needed to increase slope stability. Light-weight fill or bridging structures could be used to avoid loading slopes. Mine: If there appears to be a possibility of a collapsed mine opening or underground room near proposed facilities, methods ranging from field reconnaissance to exploratory drilling to geophysical techniques would be used to identify the location and extent of potential ground subsidence. If an opening or surface depression is found or develops after construction, it will be filled with soil or grout or bridged. Suspect areas along WSDOT facilities will be monitored by maintenance crews. Operation: Erosion Hazards: Mitigation measures will include use of temporary or permanent erosion control blankets, mulching, or soil amendment to promote plant growth. Landscaping will be planned to increase infiltration and reduce runoff where practicable and in consideration of other impacts. BMPs such as detention ponds, ditches, or structures will be constructed to reduce the stormwater erosion potential to the receiving waters. Seismic and Soft-Ground Hazards: Mitigation measures will include many of the following: staged construction of embankments so the soil has time to gain strength; wick drains to hasten consolidation and strength gain; constructing embankments of light-weight materials to minimize loading; reinforcing embankments with geosynthetics to add strength and minimize the footprint; preloading to cause settlement prior to construction of the facilities; construction on pile supports; and increasing grades to keep pavement bases above

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Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		groundwater. Soft-ground hazards at bridge locations, such as the I-5/I-405 Swamp Creek interchange, the I-405/SR 522 interchange, or the eastern terminus of SR 520, will be mitigated by founding the structures on deep foundations. Earthquakes also pose long-term risks to safe siting of the facilities. Once an appropriate level of risk has been accepted, transportation facilities in seismic hazard areas could be designed and constructed to withstand earthquake accelerations over the lifetime of the facility. Volcanic Hazard: The volcanic hazard impacts within the study area are anticipated to be quite low; therefore, no mitigation is required.
Alternative 1	Alternative 1 has the lowest magnitude of erosion, landslide, seismic, and soft ground hazards of any of the action alternatives. The risk of unmitigatable operational impacts due to locating facilities in erosion hazard areas is rated medium. Volcanic hazards are anticipated to be low.	Same as No Action Alternative.
Alternative 2	Alternative 2 has a higher magnitude of erosion and landslide hazards than Alternative 1, but is ranked lower than the other alternatives. Alternative 2 ranks behind Alternative 4 and the Preferred Alternative in relative magnitude of seismic and soft-ground hazards. Volcanic hazards are anticipated to be low.	Same as No Action Alternative.
Alternative 3	Alternative 3 has a higher magnitude of erosion and landslide hazards than Alternatives 1 and 2, but lower than Alternative 4 and the Preferred Alternative. Alternative 3 has a higher magnitude of seismic and soft ground hazard than Alternative 1. The risk of unmitigatable operational impacts due to locating facilities in erosion hazard areas is rated medium. Volcanic hazards are anticipated to be low.	Same as No Action Alternative.
Alternative 4	Alternative 4 has the highest magnitude of erosion and landslide hazards. Alternative 4 has a higher magnitude of seismic hazard than Alternative 1, but is ranked lower than Alternatives 2 and 3 and the Preferred Alternative due to the absence of effects along the BNSF right-of-way and Avondale Road. The risk of unmitigatable operational impacts due to locating facilities in erosion hazard areas is rated medium. Volcanic hazards are anticipated to be low.	Same as No Action Alternative.
Preferred Alternative	The Preferred Alternative ranks behind Alternative 4 but above the other alternatives in the risk of erosion, landslide, soft-ground and seismic hazards, and vibration impacts. Volcanic hazards are anticipated to be low.	Same as No Action Alternative.

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Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Section 3.5 Water Resources No Action Alternative	The projects proposed under the No Action Alternative would have the potential to temporarily degrade water quality during construction. One of the basins could suffer serious short-term water quality degradation due to a combination of its sloping nature and the relatively high number of projects proposed for construction (five or more) within its boundaries. The No Action Alternative would result in 173 acres of new impervious surface within the study area, a 0.1 percent increase across the entire study area. The proposed road projects under this alternative would result in an increase in runoff to local drainage systems and streams. The No Action Alternative is estimated to eliminate 104 acres of groundwater recharge area. The potential for operational impacts to degrade groundwater quality or to decrease groundwater supply under normal conditions is low and not substantial, with the exception of a traffic accident spilling hazardous pollutants, in which case impacts to groundwater quality could be substantial.	Note: Impacts of the action alternatives include those of the No Action Alternative. The No Action Alternative includes committed or funded capital improvement projects belonging to cities, counties, Sound Transit, and WSDOT. Therefore, mitigation for the No Action Alternative impacts may not be implemented by WSDOT as part of the I-405 Corridor Program. For those that are implemented by WSDOT, see mitigation for the action alternatives.
Alternative 1	Alternative 1 projects would have the potential to temporarily degrade water quality during construction. Eight of the stream basins would potentially suffer serious, short-term water quality degradation due to a combination of their sloping nature and the relatively high number of projects proposed for construction. Alternative 1 would result in 478 acres of new impervious surface within the study area, a 0.4 percent increase. Alternative 1 is estimated to eliminate 215 acres of groundwater recharge area. Additional long-term traffic through sensitive areas would increase the potential for groundwater contamination via the spill and leak mechanisms. Additional impervious surface area would also increase the potential for contamination because more rainfall runoff may pick up contaminants and reach permeable soils if runoff water is not contained. The potential for Alternative 1 operational activities to adversely impact groundwater quality is therefore rated as moderate. Although some potential exists for operational activities to impact groundwater quality and quantity, the impacts that may occur are not substantial under normal operating conditions. However, in the event a traffic accident occurred which spilled hazardous pollutants, impacts to groundwater quality could be substantial.	The following possible mitigations measures generally apply to all of the alternatives. Best management practices such as installing fencing, landscaping, erosion matting, hydro mulching, soil imprinting, hay bales, detention/sediment trap basins, and vegetated fringes will be used as appropriate. WSDOT would use the most current criteria and standards to mitigate stormwater quantity and quality impacts of the selected alternative. These standards will be presented in a WSDOT stormwater or highway runoff manual that will be functionally equivalent to Ecology's stormwater manual. These revisions are expected to address specific issues related to fish, especially chinook salmon. Construction disturbance will be limited to the smallest area practical. Clearing activities will be staged such that construction areas are cleared no more than one week ahead of the start of construction. If this is impractical, cleared areas will be mulched, covered with plastic, or otherwise stabilized. For projects constructed within 300 feet of a lake or stream, or where concentrated construction site discharge may flow directly to surface waters, all site grading and initial stabilization could be scheduled to occur only during the dry season, May 1 through September 30. Where construction must occur within stream channels, such construction will occur "in the dry," whereby streamflow is temporarily diverted around the work site, where practicable, to prevent turbidity. If

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Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		other construction activities occur during the wet season, such as subgrade or pavement installation, utilities placement, or curbs and sidewalks, a plan will be developed that: • Limits disturbed area activities to a maximum of 48 hours at any single location. • Has provisions for temporarily ceasing construction and quickly stabilizing a site when rainfall greater than one-half inch in a 12-hour period is measured at the site. • Uses alternative means for treating construction site runoff such as spray application or overland flow across a vegetated surface, or use of coagulants in the sediment ponds. If coagulants are used, then a nontoxic compound will be used, such as an ionic acrylamide. Grassed road embankments and biofiltration swales will be utilized wherever practical to maximize treatment of road runoff. Where new stream crossings are proposed, the design will consider opportunities to minimize the number of crossings by measures such as co-siting on-ramps and off-ramps. Planning for all major road upgrade projects would consider the practicality of retrofitting existing impervious road surface areas for runoff detention and treatment. Where determined to be practicable, retrofit measures will be budgeted into the road upgrade project. Any new road crossings of streams will be via a bridge spanning the 100-year floodplain unless a hydraulic analysis demonstrates that infringing abutments and/or bridge piers would not substantially change local high-water depths or velocities. Where practical, disturbed riparian areas within road right-of-way will be planted with native vegetation for a minimum width of 100 feet from each stream bank. Opportunities to increase the "perviousness" of impacted stream basins will be explored in cooperation with local agencies; these include replacing low-intensity-use paved areas (parking lots, sidewalks, walking-bicycle paths, etc.) with porous pavement and/or underground retention systems. Deep-tillage of playfields, parks, lawns, and other landscape surfaces with amended soils can also be effective in reducing runoff. Pervious portions of the study area will be treated with soil amendments, mulch, and vegetation to help absorb stormwater

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Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		rather than discharge stormwater to surface waters. All stormwater management facilities will be located outside of stream, steep slope, and wetland buffer areas. The I-405 Corridor Program will continue to work closely with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), the Washington State Department of Fish and Wildlife (WDFW), Ecology, the Tribes, local municipalities, and basin stakeholders to develop a program of support for both local and regional stream enhancement projects. Groundwater: Mitigation measures to decrease the potential for groundwater contamination in the sensitive areas are based on minimizing the use of hazardous materials in the areas. During construction, mitigation measures include: • Re-fueling and maintenance of construction vehicles will not occur within 100 feet from the edge of any sensitive areas. More restrictive measures may be required where ESA species would be impacted. Refueling will follow the Guidelines for Mobile Fueling of Vehicles and Heavy Equipment in Chapter III of the 2001 Ecology Stormwater Manual or functionally equivalent stormwater guidance. • Hazardous materials will not be stored closer than 300 feet to any stream, wetland, or other sensitive area at the project site. Where hazardous materials must be temporarily stored at the project site, secondary containment will be provided. • A project staging area will be located outside of the sensitive areas for vehicle fueling and storage of construction-related hazardous materials. The area will be designed to capture all runoff and/or spills. • Runoff from construction areas will be collected and treated and/or discharged consistent with Ecology's Stormwater Manual or functionally equivalent stormwater guidance. Measures to protect Renton's Aquifer Protection Area from infiltration of project runoff will be implemented. • A plan for hazardous material spill response will be developed. • Fill will not contain hazardous materials or materials that could adversely affect upland and/or aquatic species due to

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		leaching or bioaccumulation. Measures for mitigation of operational impacts to groundwater quality are also based on preventing hazardous materials from reaching soil and infiltrating into groundwater. These measures include: • Runoff from construction areas will be collected and treated and/or discharged consistent with Ecology's Stormwater Manual or functionally equivalent stormwater guidance. Measures to protect Renton's Aquifer Protection Area from infiltration of project runoff will be implemented. • Spill prevention, control, and countermeasure plans will be developed and will include local, state, and federal emergency contact information. • Barriers will be placed at the sides of roads within WHPAs, SSAs, and high CARAs to prevent spills from reaching soils. The last two measures may be applied specifically to address the substantial potential for groundwater contamination that could occur under the rare traffic accident chemical spill scenario. To mitigate the potential decrease in groundwater recharge in CARAs and other potential recharge areas during construction, stormwater that might have been collected and conveyed to areas outside the CARAs can be re-infiltrated. In this scenario, the mitigation measures will include some form of treatment to ensure that groundwater quality is not adversely affected, such as the use of bioswales or infiltration ponds. Other measures for mitigating long-term loss of recharge to aquifers include: • Decreasing slopes of areas not covered with impervious surfaces. • Planting vegetation in cleared areas. • Providing adjacent infiltration areas where large areas of impervious surfaces are unavoidable; in other words, interspersing pervious areas among the impervious areas to allow recharge via infiltration of rainwater. Runoff from construction areas will be collected and treated and/or discharged consistent with Ecology's Stormwater Manual (2001) or functionally equivalent stormwater guidance.

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Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings

Element	Environmental Consequences	Summary of Mitigation
		Measures to protect Renton's Aquifer Protection Area from infiltration of project runoff will be implemented. Additional mitigation measures may be achieved by following the design guidelines in the local sensitive area ordinances (such as measures to prevent erosion) and local erosion codes, such as Renton's dealing with Aquifer Protection Areas. To mitigate the depletion of groundwater supplies via construction dewatering or pump testing, the groundwater that is removed may be re-infiltrated, provided programs are in place to test for and/or treat the groundwater to remove hazardous materials that may have come in contact with the groundwater. The eastern extension of the HCT to Issaquah lies within the Lake Sammamish Basin. Projects constructed within this basin would require special stormwater treatment to reduce phosphorus.
Alternative 2	Alternative 2 projects would have the potential to temporarily degrade water quality during construction. Under Alternative 2, 11 of the stream basins would potentially suffer serious, short-term water quality degradation due to a combination of their sloping nature and the relatively high number of projects proposed for construction. Six basins could experience long-term impacts to base flow and one basin would suffer water quality impacts. Alternative 2 would result in 820 acres of new impervious surface within the study area, a 0.6 percent increase across the entire study area. Alternative 2 is estimated to eliminate 410 acres of groundwater recharge area. The potential for Alternative 2 operational activities to adversely impact groundwater quality is rated moderate, but the relative extent of impacts is higher than for Alternative 1 and the No Action Alternative. Although some potential exists for operational activities to impact groundwater quality and quantity, the impacts that may occur to groundwater quality and quantity are not substantial under normal operating conditions. However, in the traffic accident scenario, impacts to groundwater could be substantial.	See Alternative 1.The eastern extension of the HCT to Issaquah lies within the Lake Sammamish Basin. Projects constructed within this basin would require special stormwater treatment to reduce phosphorus. A WRIA-wide approach to mitigation of the program hydrologic impacts should be considered as a means to address base flow impacts in a more ecologically beneficial and cost-effective manner. Groundwater: Same as Alternative 1.

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Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Alternative 3	Alternative 3 projects would have the potential to temporarily degrade water quality during construction. Under Alternative 3, 10 of the stream basins would potentially suffer serious, short-term water quality degradation due to a combination of their sloping nature and the relatively high number of projects proposed for construction. Three basins could experience long-term impacts to base flow. Alternative 3 would result in 773 acres of new impervious surface within the study area, a 0.6 percent increase. Alternative 3 is estimated to eliminate 387 acres of groundwater recharge area. The potential for Alternative 3 operational activities to adversely groundwater quality is rated moderate, with the relative extent of impact approximately equal to that for Alternative 2. Although some potential exists for operational activities to impact groundwater quality and quantity, the impacts that may occur to groundwater quality and quantity are not substantial under normal operating conditions. However, in the traffic accident scenario, impacts to groundwater could be substantial.	Stormwater: See Alternative 1. Wherever soil tests and site conditions demonstrate the practicability, infiltration of treated stormwater will be utilized. This mitigation is particularly applicable to South Kelsey and North Creek Basins. In addition, where practicable WSDOT and the affected municipalities would commit to projects benefiting the hydrology and habitat of these streams as measures to compensate for potential reductions in stream base flow resulting from proposed road improvements. In addition, a WRIA-wide approach to mitigation of the program hydrologic impacts will be considered as a means to address base flow impacts in a more ecologically beneficial and cost-effective manner. Groundwater: Same as Alternative 1.
Alternative 4	Alternative 4 projects would have the potential to temporarily degrade water quality during construction. Under Alternative 4, 10 of the stream basins would potentially suffer serious, short-term water quality degradation due to a combination of their sloping nature and the relatively high number of projects proposed for construction. Seven basins could experience long-term impacts to base flow and one basin would suffer water quality impacts. Alternative 4 would result in 1,061 acres of new impervious surface within the study area, a 0.8 percent increase across the entire study area. Alternative 4 is estimated to eliminate 531 acres of groundwater recharge area. The potential for Alternative 4 operational activities to adversely impact groundwater quality is rated moderate. The extent of impacts would be similar to those for Alternative 3, with a slightly shifted distribution. Although some potential exists for operational activities to impact groundwater quality and quantity, the impacts that may occur to groundwater quality and quantity are not substantial under normal operating conditions. However, in the traffic accident scenario, impacts to groundwater could be substantial.	Stormwater: See Alternative 1. Projects constructed within the Lake Sammamish Basin would require special stormwater treatment to reduce phosphorus. Wherever soil tests and site conditions demonstrate the practicability, infiltration of treated stormwater will be utilized. This mitigation is particularly applicable to those basins which may otherwise experience depletion of base flows: Springbrook, South Kelsey, East Lake Washington, Forbes, Juanita, and North Creek. In addition, where practicable WSDOT and the affected municipalities would commit to projects benefiting the hydrology and habitat of these streams as measures to compensate for potential reductions in stream base flow resulting from proposed road improvements. In addition, a WRIA-wide approach to mitigation of the program hydrologic impacts will be considered as a means to address base flow impacts in a more ecologically beneficial and cost-effective manner. Groundwater: Same as Alternative 1.
Preferred Alternative	Preferred Alternative projects would have the potential to temporarily degrade water quality during construction. Under the Preferred Alternative, 13 of the stream basins would potentially suffer serious, short-term water quality degradation due to a combination of their sloping nature and the relatively high number of projects proposed for construction. Six basins could experience long-term impacts to base flow and one basin would suffer water quality impacts.	Stormwater: See Alternatives 1 and 3. The mitigation measures presented for Alternative 4 would be applicable for the Preferred Alternative. Infiltration of treated stormwater will be emphasized in the following basins as a measure to mitigate depletion of base flow: East Lake Washington, Juanita, Springbrook, South Kelsey, and North Creeks. Groundwater: Same as Alternative 1.

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Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
	The Preferred Alternative would result in 974 acres of new impervious surface within the study area - a 0.7 percent increase. The Preferred Alternative is estimated to eliminate 487 acres of groundwater recharge area. The potential for the Preferred Alternative operational activities to adversely impact groundwater quality is rated moderate, with the relative impact between Alternatives 3 and 4.	
Section 3.6 Wetlands No Action Alternative	The No Action Alternative would potentially impact 25 wetland complexes, including 9 High Priority (HP) wetland complexes, totaling approximately 3 acres of encroachment. This is the lowest number of HP wetland complexes and the least area affected of any alternative. Most No Action Alternative improvements near HP wetlands occur in Redmond, Woodinville, and Renton. Committed arterial projects would impact the greatest number of wetlands of all project types in this alternative. Arterial committed projects would affect 14 wetland complexes, 6 of which are HP wetlands. No new roads are proposed in this alternative; therefore, the potential for this alternative to fragment wetland habitat is low. This alternative also results in the lowest increase in impervious surface of all the alternatives. Pollutant loading and overall impacts to wetlands from the improvements were judged to be below the threshold of significance. Retrofitting of existing stormwater facilities could occur in conjunction with many of the projects.	The following mitigation measures generally apply to all alternatives. Because wetland functions generally vary between HP and LP wetlands, mitigation needs also vary. HP wetlands generally require higher mitigation ratios than LP wetlands. Implementing mitigation prior to wetland disturbance may help minimize temporary losses of wetland functions, although it may take 10 or more years for wetlands to mature enough to fully replace lost functions. While impacted wetlands within the study area may not provide all of their historic functions, they remain a valuable and sometimes irreplaceable resource. Because of this, the focus during project design and any early-action mitigation will be to implement the following steps for all wetlands regardless of a wetland's priority status (HP or LP): The sequential steps generally taken in the wetland mitigation process are: • Avoiding impacts. • Minimizing impacts. • Restoring the impacted environment. • Reducing impacts over the life of the project using preservation and maintenance operations. • Compensating for unavoidable adverse impacts by replacing the affected environment or providing substitute resources. • Monitoring the impacted environment and taking appropriate corrective measures as needed. Project-level design or early-action mitigation will consider these factors to assure that the appropriate mitigation approach

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		is implemented. Mitigation will be implemented prior to wetland impacts where feasible, to reduce temporary losses of wetland functions (Appendix J). Sufficient property is anticipated to be available within the study area for mitigation. In some highly developed watersheds, suitable vacant parcels available for mitigation may be rare. Identification of available parcels for mitigation will be dependent upon specific real estate conditions and will be undertaken during project-level analysis. Mitigation sites should provide connectivity with the remaining wetlands within the basin whenever possible, although isolated wetlands in highly developed areas are not without value, as they provide habitat for urban wildlife. Finding non-wetland property in proximity to a suitable hydrologic source will be increasingly difficult under increased development pressure. In some instances, out-of-kind watershed restoration may provide adequate or even higher levels of wetland/watershed functions than in-kind wetland replacement. While out-of-kind restoration is a potential option for each alternative being analyzed, its value would be assessed on a case-by-case basis. Mitigation banking will be an option where on-site mitigation is not possible or is less environmentally beneficial. Mitigation banking would allow acquisition of credits, which go toward enhancing, creating, or restoring wetlands at a designated site. Once the wetland is created and functioning, these credits would compensate for unavoidable wetland impacts. The bank creators, or sponsors, assume responsibility for maintaining the wetlands in perpetuity or they could sell the site to another owner, who would then assume responsibility. Banking may only occur if the wetland impacts could not be avoided or minimized to an acceptable level on-site. Regional wetland mitigation facilities may have the potential to improve many wetland functions, particularly fish-rearing habitat, peak flow attenuation, large habitat areas with limited disturbance and edge area, and low flow augmentation. Because of the typically large number of oftentimes-small wetland impacts associated with linear transportation projects, there may exist the opportunity for regional wetland restoration or enhancement. However, the specific functions appropriate for restoration and/or enhancement would depend upon the particular mix of transportation elements and projects chosen as

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		the preferred alternative. Combining such impacts into a few regional restoration projects may not be practicable. Opportunities for restoration are highly site-specific, depending greatly upon the functions provided by the existing watershed conditions, and thus specific parcels for wetland restoration or mitigation have not been identified. This early analysis assumes that avoiding wetlands altogether is the first step in the mitigation process. Project-level impact analysis will evaluate how some operational impacts will be mitigated. For instance, road impacts to wetlands may be avoided or minimized by using methods other than widening at the surface (e.g., stacking lanes or tunneling) where practicable to increase capacity in the vicinity of environmentally sensitive or important areas. Measures to avoid and minimize increases in impervious surfaces and increased stormwater runoff so as to not alter wetland hydrology in downstream reaches will be incorporated through project-level design where practicable. Some typical avoidance measures to be contemplated include: • Using or lengthening bridges to cross streams and their associated riparian corridors and wetlands; • Using retaining walls to reduce or eliminate lateral extensions of road embankment slopes into wetlands; • Using guardrails to increase the grade of embankments and avoid wetland fill; • Stacking or constructing viaducts; and • Constructing tunnels. Best management practices (BMPs) will be utilized to minimize sedimentation, and contamination. These practices will include procedures such as sediment fences, check dams, temporary seeding, mulching, jute netting, phased construction, and construction during less sensitive seasons where appropriate. Stormwater treatment facilities will be designed consistent with the Ecology stormwater manual or functionally equivalent stormwater guidance, such as WSDOT's highway runoff manual. Mitigation locations and concepts will be identified during the permitting for specific projects and during possible early-action mitigation activities (See Appendix J of this EIS). WSDOT

Table S-2:
Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings

Element	Environmental Consequences	Summary of Mitigation
		has met and will continue to meet with state and local agencies to identify mitigation priorities and options, and to discuss opportunities for on-site mitigation and mitigation banking. Another option that could be utilized on a case-by-case basis is replacing lower value roadside emergent wetlands with high value streamside wetlands. Although roadside wetlands provide water quality, groundwater recharge, and stormwater retention functions, replacing them at high ratios would not always be advantageous. Many of these roadside wetlands are dominated by invasive species such as reed canarygrass and can successfully and quickly be replaced (unlike forested wetlands). Since the availability of streamside wetlands that provide refugia for salmonids is often a limiting factor in Puget Sound Lowland streams, shifting part of the mitigation ratio to high value wetlands that provide other critical functions may be a viable option in some cases. An example of such a scenario is if 1 acre of roadside emergent wetlands were to be filled and the mitigation ratio were 2.5:1. Under this scenario, 2.5 acres of new roadside emergent wetlands could be required to mitigate for the impacts. However, the roadside emergent wetland could be replaced at a 1:1 ratio, with the remaining 1.5 acres of mitigation going toward addressing other basin needs. In this scenario 1.5 acres of streamside wetlands could also be created. WSDOT is currently working on an *Early-Action Environmental Impact Mitigation Decision-Making Process* that will help guide the mitigation process and align WSDOT mitigation needs with various watershed and salmonid recovery needs (Appendix J; Smith, 2002). ***Specific Mitigation*** Specific mitigation can not be defined at the programmatic level of analysis. This is a result of uncertainties in the actual amount and type of wetland impacts, amount and type of required mitigation, variation in existing opportunities for mitigation in each basin, and early stage of coordination with affected jurisdictions. Furthermore, impact reduction measures to be developed during the project design phase will reduce the amount of required mitigation. See additional language in Section 3.6.5.1.
Alternative 1	Alternative 1 would potentially impact 76 wetland complexes, including 30 High Priority wetlands, totaling approximately 29 acres of fill. This is the lowest number of High Priority wetlands and least	See No Action Alternative.

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Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
	area affected of the action alternatives except the Preferred Alternative. Approximately 17 acres of wetland impacts are associated with the HCT improvements. While some part of the HCT system proposed under this alternative may fragment wetlands, much of the new construction presents opportunities to avoid wetlands. The potential for this alternative to fragment wetland habitat is consequently low to moderate. The amount of construction required for this alternative, while greater than that required for the No Action Alternative, would be considerably less than for the other action alternatives except for the Preferred Alternative.	
Alternative 2	Alternative 2 would potentially impact 110 wetland complexes, 38 of which are High Priority wetlands, totaling approximately 56 acres of fill. This is the highest number of High Priority wetland complexes impacted of any alternative. Widening SR 167 from I-405 to the study area boundary has the most potential to substantially alter wetlands/wetland buffers, and could impact approximately 22 acres of wetlands. As was the case in Alternative 1, Alternative 2 could impacted an additional 17 acres of wetlands as a result of HCT improvements. Some impacts associated with riparian wetland crossings (e.g., the North Creek, Black River, or the Sammamish River) would likely be unavoidable. The potential for this alternative to fragment wetland habitat is high in comparison to the other action alternatives. Impervious surface area is nearly twice that of Alternative 1. Many of the impacts associated with Alternative 2 would be unavoidable, as they are expansions or additions to existing roads and realignment would not be practical.	See No Action Alternative.
Alternative 3	Alternative 3 would potentially impact 96 wetland complexes, including 34 High Priority wetlands, totaling 40 acres of fill. This is the second lowest number of High Priority wetlands impacted of the action alternatives, but the second highest area affected by fill due to widening of SR 167 from I-405 to the study area boundary. Potential for this alternative to fragment wetland habitat is moderate to high, while opportunities to avoid wetlands by realigning proposed roads would be few.	See No Action Alternative.
Alternative 4	Alternative 4 is similar to Alternative 3 in that it would also potentially impact 96 wetland complexes, including 36 High Priority wetlands, totaling 39 acres of wetland area filled. This is the second highest number of High Priority wetlands impacted but identical to the Preferred Alternative, and the second greatest area affected of any alternative due to the widening of SR 167 from I-405 to the study area boundary. Thus there is great potential for wetlands fragmentation, coupled with little opportunity to avoid wetlands by altering proposed alignments. The greatest area of impervious surface would be added in this alternative.	See No Action Alternative.
Preferred Alternative	The Preferred Alternative would potentially impact 85 wetland complexes, including 36 High Priority wetlands, totaling 25 acres of wetland area filled. The number of High Priority wetland complexes impacted is the same as Alternative 4, but the lowest acreage affected of any action alternative due to the absence of HCT improvements and reduction in length of widening of SR 167. Thus there is less potential for wetlands fragmentation than other alternatives. The second greatest area of impervious surface would be added in this alternative.	See No Action Alternative.

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Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Section 3.7 Wildlife, Habitat, and Upland Threatened and Endangered Species		
No Action Alternative	For all alternatives, priority habitats identified within the analysis area include freshwater wetlands, riparian zones, bald eagle territory, great blue heron habitat, pileated woodpecker habitat, waterfowl concentration areas, and urban natural open space. Much of the urbanized portion of the study area is inhabited by species typical of developed areas. The prevalence of development and landscape maintenance activities in these areas has resulted in the predominance of species adapted to degraded and disturbed habitats. The WDFW (2000) identifies five bald eagle territories, five patches of pileated woodpecker habitat, one occurrence of osprey habitat (a state Monitor species) one area for western pond turtles (State Endangered, Federal Species of Concern), and great blue heron (a WDFW Priority species) rookery. Most of the habitat area encountered falls within right-of-way. These areas typically have low habitat value to wildlife and are generally highly disturbed. Wildlife could occasionally occupy these areas; however, such occurrence is likely to be short-term. For the No Action Alternative, the alternative could affect up to 3,600 linear feet of habitat located within bald eagle territories and 12,200 linear feet of urban natural open space, and no riparian habitat. The No Action Alternative is not expected to have substantial adverse impacts on upland vegetation, habitat, wildlife, or endangered/threatened species. Most of the corridor is at or near buildout and the opportunity for future development is limited.	The following mitigation measures generally apply to all alternatives where appropriate to the project. Measures for mitigating impacts may include: • Implementing timing restrictions on construction could be implemented to protect bald eagle nesting habitats; • For projects located within 0.25 mile of any bald eagle nests or roosts or within 800 feet of any great blue heron rookeries, WSDOT will work with WDFW to develop management plans to avoid and minimize impacts which may occur during construction and operation of the project. (Typical avoidance and minimization strategies may include timing restrictions during construction, installation of noise barriers, protection of perch trees, and installation or establishment of visual barriers.); • Providing wildlife access corridors under roadways as a measure to reduce the affects of habitat fragmentation by maintaining connectivity between habitats; and • Revegetating roadsides and construction zones with native plants to offset loss of habitat from construction. Other construction mitigation measures will also be employed. Needs and measures will be evaluated at the project level.
Alternative 1	Alternative 1 could affect 43,100 linear feet of urban natural open space resulting in habitat loss from the installation of the HCT system and disturbance to the periphery of habitats. The alternative could impact 40,100 linear feet[a] of bald eagle territory and 12,340 linear feet of riparian area, and construction would occur within 0.3 mile of one bald eagle nest.	Same as No Action Alternative.
Alternative 2	Alternative 2 would encounter 48,960 linear feet of urban natural open space could affect 54,160 linear feet[a] of habitat within bald eagle territories, and would impinge on 20,900 linear feet of riparian habitat.	Same as No Action Alternative.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Alternative 3	Alternative 3 could affect 52,300 linear feet of urban natural open space and 41,260 linear feet[a] of bald eagle territory (one bald eagle nest could experience increased noise disturbance), and could encroach on 13,560 linear feet[a] of riparian habitat.	Same as No Action Alternative.
Alternative 4	Alternative 4 encounters 33,900 linear feet of urban natural open space and 50,460 linear feet[a] of bald eagle territory, and could encroach on 11,120 linear feet[a] of riparian habitat.	Same as No Action Alternative.
Preferred Alternative	The Preferred Alternative encounters 49,020 linear feet of urban natural open space and 60,880 linear feet[a] of bald eagle territory and could encroach on 13,560 linear feet[a] of riparian habitat.	Same as No Action Alternative.
Section 3.8 Fish and Aquatic Habitat		
No Action Alternative	The I-405 corridor study area lies entirely within two major watersheds: mostly within the Cedar River/Lake Washington (200 square miles and hundreds of tributaries) and a small portion within the Green Watershed. The Puget Sound chinook salmon and bull trout are listed as "threatened" under ESA and occur in both watersheds. Bull trout migrate through the study area, but bull trout spawning has been documented only in locations far upstream. Coho salmon, a "candidate" species for federal listing is present in the major streams of the study area. The No Action Alternative would create 74 new riparian encroachments, which is less than one-third the number of any of the action alternatives. Fifty-one of these would occur in the Sammamish Basin and no more than six would occur in any of the other basins. The No Action Alternative would increase impervious surface in the study area basins by 0.1 percent. This percentage represents 173 acres of new impervious surface. The greatest increase would occur in the North Creek Basin, followed by the Sammamish River, Little Bear Creek, Mercer Slough, Cedar River, Swamp Creek, and Juanita Creek basins. No increase is expected for the Bear Creek, Forbes Creek, Kelsey Creek, Lower Green River, and North Lake Washington basins. The *I-405 Corridor Program Draft Surface Water Resources Expertise Report* (CH2M HILL, 2001) concluded that no substantial direct effects on hydrology or water quality are expected under this alternative.	Note: The No Action Alternative includes committed or funded capital improvement projects belonging to cities, counties, Sound Transit and WSDOT as part of the I-405 Corridor Program. For those that are implemented by WSDOT, see mitigation for the action alternatives. The following mitigation measures generally apply to all alternatives where appropriate.
Alternative 1	Alternative 1 would result in 261 riparian encroachments, substantially fewer riparian encroachments than other action alternatives. This indicates substantially less potential for direct construction impacts to fish habitats and populations. Alternative 1 would add 478 acres of new impervious area to the study area basins for a 0.3 percent increase above the No Action Alternative. The Black River, Mercer Slough, Sammamish River, East Lake Washington, and North Creek basins would experience the greatest increases. For the West Lake Sammamish Basin, this alternative would create the most impervious surface of any alternative. No substantial effects on hydrology or water quality are expected under this alternative. Overall, Alternative 1 has the least potential impact on fish populations and habitats, including threatened	Impact avoidance and minimization measures include, but are not limited to , the following: • Redirecting proposed improvements through developed uplands where practicable; • Reducing project foot-print where practicable; • Spanning waterways with bridges outside of the active floodplain where practicable; and • Utilizing best available science to document, avoid, and then mitigate for potential impacts.

Table S-2:
Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
	species, of any action alternative.	Compensatory fish and habitat mitigation measures can be divided into three categories: 1) on-site/in-kind, 2) sub-basin, and 3) watershed level. It is WSDOT policy, at a minimum, to control and treat stormwater runoff that could impact fish and habitat such that downstream flood damage and/or serious water quality problems are not increased as a result of new road projects. This could require on-site/in-kind mitigation. This mitigation type replicates as closely as possible specific lost environmental functions (such as suitable spawning habitat for a specific fish species). On-site/in-kind mitigation is applicable to the I-405 Corridor Program at the project-level, as the specific impacts of each project are assessed. Mitigation can then be incorporated into project design, or mitigation opportunities can be identified in the immediate vicinity. It is not always feasible to provide suitable mitigation near a project site, particularly in a highly developed, mostly urban area such as the I-405 corridor. Some regulatory agencies suggest that advanced watershed-based mitigation may involve efforts such as preservation of higher-quality habitat in locations upstream of the study area. In addition, mitigation could be provided outside the project area to address cumulative impacts associated with changes in transportation capacity on I-405. It must be noted that assigning credit for advanced watershed-based mitigation to project-specific impacts will likely require extensive analysis and negotiation. The State of Washington has developed interagency policy guidance for evaluating aquatic mitigation. In making regulatory decisions, the agencies are instructed to "consider whether the mitigation plan provides equal or better functions and values, compared to existing condition, for the target resources and species." Impact Avoidance Measures A number of best management practices (BMPs) will be employed during construction of each specific project to reduce the potential for adverse stream impacts during construction of various projects. The following bullets describe the types of mitigation measures that will be implemented for appropriate projects; however, use of alternate, equally effective BMPs or negotiated mitigation may be developed in the future.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		• Construction disturbances will be limited to the smallest area practical. When feasible, clearing activities will be staged such that construction areas are cleared no earlier than one week ahead of the start of construction. • Seasonal in-stream work "windows" as established by the WDFW, USFWS, and NMFS, will be observed. Major clearing and grading will be limited to the dry season: usually May 1 through September 1, where reasonable and feasible to avoid construction impacts. If other construction activities are to take place during the wet season, an erosion and sediment control plan will be prepared detailing measures required to provide adequate control and treatment of construction site runoff during wet season conditions. These measures could include shortened intervals for ground-disturbing activities; ceasing of construction activities and rapid stabilization measures during and following storms greater than one-half inch in 24 hours; and additional treatment to remove suspended solids and turbidity from collected project site runoff prior to discharge (CH2M HILL, 2001b). • Exposed bare soil will be covered as soon as possible after grading to minimize erosion potential using typical techniques such as hydroseeding, mulching, or matting. • Erosion on slopes will be minimized by using techniques such as roughening, terracing, or contouring slopes before seeding. • Sediment transport off-site or into drainage features/facilities will be avoided, using techniques such as filter fabric fence installed downstream of all exposed slopes, around existing drainage inlets, and along river, stream, and drainage channels in the vicinity of work areas. • Toxic pollution will be controlled, by requiring that all equipment be maintained and refueled where potential spills and stormwater runoff can be contained. A toxic spill response plan will be designed to contain any spills that occur. Water quality monitoring programs may be required by jurisdictional agencies to sample above and below construction areas, before, during and after project construction.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		Specific construction techniques will be designed at the project phase to reduce the potential of adverse stream impacts. For example, bridge construction methods that avoid temporary work bridges will be considered, and any temporary stream structures will avoid the use of chemically treated wood materials such as creosote or chemonite. Creosote treated woods will not be used for any in-stream structures. Compensatory Measures On-site/in-kind mitigation is most effective in avoiding construction impacts, but direct displacement of habitat may require compensation. For example, riparian areas cleared for construction staging or access will be revegetated with native plant species. If in-stream habitat is unavoidably displaced by new structures, on-site opportunities for creating additional habitat will be investigated. Habitat enhancement will compensate for the habitat functions that were lost, specific to fish species and life-stage. **Operational Impact Mitigation** Impact Avoidance Measures The I-405 Corridor Program alternatives presently identify projects only at a conceptual level; no detailed project design has been completed. The most effective mitigation for operational impacts will be to design individual projects for impact avoidance or minimization. Examples of the types of mitigation that will be implemented include: • Designing stream crossings to be passable for migrating fish. • Stormwater runoff quantity: Detaining runoff from new impervious surfaces in accordance with Washington State Department of Ecology's (Ecology) current stormwater drainage manual, or functionally equivalent stormwater guidance, and infiltrate to groundwater where feasible. • Stormwater runoff quality: Treating collected stormwater runoff from new impervious surface in accordance with the Ecology drainage manual or functionally equivalent stormwater guidance using sedimentation ponds, filter systems, wetponds, vegetated swales, and filtering devices.

Table S-2:
Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings

Element	Environmental Consequences	Summary of Mitigation
		Compensatory Measures One compensatory measure for operational impacts will be retrofitting of existing impervious surface for stormwater runoff quantity and quality. WSDOT will consider non-engineering solutions, such as removal of existing impervious surfaces and conversion into naturally vegetated habitat, where practicable and permittable. Sub-Basin Level Mitigation A number of mitigation projects have been previously identified by local jurisdictions to meet existing habitat enhancement/protection needs throughout sub-basins in the I-405 Corridor Program study area. As mitigation for the I-405 Corridor Program improvements, WSDOT will consider participating in some of these projects to gain mitigation credit for project-level impacts while contributing toward overall restoration of sub-basins and watersheds. Mitigation opportunities identified by each local jurisdiction are summarized in the EIS section.
Alternative 2	Alternative 2 would result in 421 riparian encroachments, the highest of any alternative in 13 of the 19 basins and would have the highest potential for construction impacts of all the action alternatives. This alternative would create 820 acres of new impervious surface. The potential for operational impacts to degrade groundwater quality or to decrease groundwater supply is low and not substantial, with the exception of a traffic accident spilling hazardous pollutants, in which impacts to groundwater quality could be substantial.	Same as Alternative 1.
Alternative 3	Alternative 3 would result in 325 riparian encroachments and would create 773 acres of new impervious surface. The potential for operational impacts to degrade groundwater quality or to decrease groundwater supply is low and not substantial, with the exception of a traffic accident spilling hazardous pollutants, in which impacts to groundwater quality could be substantial.	Same as Alternative 1.
Alternative 4	Alternative 4 would result in 354 new riparian encroachments, the highest of any alternative for 2 of 19 basins. Alternative 4 would result in 1,061 acres of new impervious surface The potential for operational impacts to degrade groundwater quality or to decrease groundwater supply is low and not substantial, with the exception of a traffic accident spilling hazardous pollutants, in which impacts to groundwater quality could be substantial. It would create substantially more new impervious cover than	Same as Alternative 1.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
	other action alternatives. In addition, Alternative 4 includes the only proposed activity outside the UGA, in the Sammamish River basin on Highway 202 north of 128th Street in Redmond.	
Preferred Alternative	The Preferred Alternative would result in 330 new riparian encroachments. The Preferred Alternative would result in 974 acres of new impervious surface. It would create more new impervious cover than Alternative 3, but not as much as Alternative 4. The potential for operational impacts to degrade groundwater quality or to decrease groundwater supply is low and not substantial, with the exception of a traffic accident spilling hazardous pollutants, in which impacts to groundwater quality could be substantial.	Same as Alternative 1.
Section 3.9 Farmland		
No Action Alternative	Farmlands are not dominant features within the corridor. King County contains portions of the Sammamish River Valley Agricultural District near major roadways. There are no substantial or protected farmlands south of Redmond. All of the impacts to farmlands within the I-405 Corridor are in the Sammamish Valley region. The impacts all result from road widening improvements, which have a linear impact on farmland without affecting the majority of the farms or causing additional fragmentation of local farms. Under the No Action Alternative, two areas of farmland totaling about 6 acres would potentially be affected; however, no prime or unique farmlands would be affected by operation of the I-405 corridor improvements.	Under the No Action Alternative, the Willows Road improvements could be constructed so that any expansion outside the right-of-way could be done on the west (southbound) side, thus avoiding farmland impact. Avoidance of impingement on farmland along the NE 124th Street improvements is not practicable, as farmlands exist on both sides of the right-of-way.
Alternative 1	No prime or unique farmlands would be affected by operation of the I-405 Corridor Program improvements. This is the lowest potential effect of any action alternative.	For Alternative 1, no adverse impacts on farmlands are expected to occur beyond those identified for the No Action Alternative; therefore, no additional mitigation measures would be required.
Alternative 2	Under Alternative 2, one area of protected farmland totaling about .2 acre would potentially be affected.	Where practicable, considering other social, economic and environmental impacts, all of the improvements will be designed so that any expansion outside the right-of-way is done on the side of the road that does not affect farmland, thus avoiding any substantial farmland impact.
Alternative 3	Under Alternative 3, two areas of protected farmland of about 7 acres total could be affected.	Same as Alternative 2.
Alternative 4	Alternative 4, as with the Preferred Alternative, has the potential to impact seven areas of farmland. About 14 acres would be affected.	Same as Alternative 2.

Table S-2:
Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings

Element	Environmental Consequences	Summary of Mitigation
Preferred Alternative	The Preferred Alternative, along with Alternative 4, has the greatest potential to impact protected farmlands, with seven areas of farmland affected. About 14 acres would be affected.	Same as Alternative 2.
Section 3.10 Floodplains		
No Action Alternative	Within the project study area there are 18 floodplains that are either crossed or are adjacent to I-405, potential high-capacity corridors, and arterials. The evaluation of the action alternatives assumes that all of the No Action Alternative projects would be built. Under the No Action Alternative there are 6 projects that would potentially impact 5 floodplains. This includes 5 culvert or bridge crossings of the floodway. The potential length of floodplain impact is 13,950 feet.	In situations where the floodway area of the floodplain is crossed, the floodway will be spanned or bridged so that flows are not impeded. All roadways will cross major rivers (Duwamish River, Green River, Cedar River, and Sammamish River) on bridges with few or no piers in the floodway.
Alternative 1	Under Alternative 1, 23 projects would either enter or cross 14 different 100-year floodplains. 22 floodway crossings by culverts or bridges would be lengthened or replaced, with a potential for 31,650 linear feet of floodplain impacts. The potential impact on floodplains would be relatively low. No operational impacts are anticipated, since the roadway can be designed to avoid the floodway and structural design requirements would result in a zero increase in flood elevation.	The amount of fill in floodplains will be limited by building walls or steep engineered fill slopes adjacent to the floodplain rather than standard fill slopes where practicable. When crossing a river, a longer bridge span could be used. Other possible mitigation measures include widening existing bridges, increasing existing culvert sizes, or replacing existing culverts with bridges. Mitigation anywhere along the stream system, including purchase of development rights, can reduce flood flows and limit the rise in the floodplain. Design and specifications will be prepared in conjunction with biologists to reduce impacts on the natural stream bed and, when appropriate to the given project, impacts will be mitigated by placing gravel in the culverts, planting riparian trees, and using other natural features such as log weirs, boulders, and other types of woody debris. Construction will be done during low flow periods that are least likely to harm fish and other wildlife in accordance with WDFW requirements. Maintenance of stream crossing structures will be reduced by selecting materials with longevity and low maintenance requirements and by selecting larger sizes of culverts or bridges with more clearance. Maintenance will be accomplished during low flow with the least obtrusion.

Table S-2:
Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings

Element	Environmental Consequences	Summary of Mitigation
Alternative 2	Under Alternative 2, 37 projects would either enter or cross 14 different 100-year floodplains. 41 floodways would be crossed by culverts or bridges that would be lengthened or replaced, with a potential for 48,025 linear feet of floodplain impacts. The potential impact on floodplains would be moderate. During construction, no impacts to the floodplain storage are anticipated. There may be impacts to floodplain ecological functions. No operational impacts are anticipated, since roadways can be designed to avoid the floodway and structural design requirements would result in a zero increase in flood elevation.	Same as Alternative 1.
Alternative 3	Under Alternative 3, 36 projects would either enter or cross 14 different 100-year floodplains. 40 floodways would be crossed by culverts or bridges that would be lengthened or replaced, with a potential for 48,125 linear feet of floodplain impacts. The potential impact on floodplains adjacent to I-405 would be high. During construction, no impacts to the floodplain storage are anticipated. There may be impacts to floodplain ecological functions. Same construction and operational impacts as Alternative 2.	Same as Alternative 1.
Alternative 4	Under Alternative 4, 36 projects would either enter or cross 14 different 100-year floodplains. 41 floodways would be crossed by culverts or bridges that would be lengthened or replaced, with a potential for 39,175 linear feet of floodplain impacts. The potential impact on floodplains adjacent to I-405 would be high, especially Springbrook Creek and North Creek. During construction, no impacts to the floodplain storage are anticipated. There may be impacts to floodplain ecological functions. Same construction and operational impacts as Alternative 2.	Same as Alternative 1.
Preferred Alternative	Under the Preferred Alternative, approximately 43 projects would either enter or cross 14 different 100-year floodplains. Approximately 45 floodways would be crossed by culverts or bridges that would be lengthened or replaced, with a potential for slightly more than 48,125 linear feet of floodplain impacts. The potential impact on floodplains adjacent to I-405 would be high. During construction, no impacts to the floodplain storage are anticipated. There may be impacts to floodplain ecological functions. Same construction and operational impacts as Alternative 2.	Same as Alternative 1.
Section 3.11 Shorelines No Action Alternative	The No Action Alternative would affect 6 jurisdictional shorelines; however, no substantial impacts to shorelands are anticipated during construction. Operation of the proposed transportation improvements would not result in substantial adverse environmental impacts.	The following types of mitigation and avoidance measures will be incorporated into individual project planning and design as appropriate and practicable: • Alignment of roadways to keep improvements out of the shoreline. • Minimizing right-of-way property acquisition within the shoreline by narrowing roadway shoulders.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		• Incorporating new public access, shoreline protection and preservation measures, and habitat enhancement to the shoreline (on arterial improvements) into design when mitigation measures are necessary to address substantial adverse environmental impacts from the project. • Replacing culverts to aid in fish passage. • Where appropriate (based on project design and project-level environmental analysis, documentation, and review), elevating HCT to allow safe access to shoreline homes and parks that are only accessible by uncontrolled, at-grade rail crossings. • Including pedestrian and bicycle underpasses in design so that access along shorelines is maintained. • Including shoreline protection, preservation, and habitat enhancements in project design. • Modifying existing projects so that shoreline protection and preservation as well as public access along shorelines are improved. • Using aesthetic treatments and barriers to buffer the shoreline from visual and noise effects.
Alternative 1	Ten different jurisdictional shorelines would be crossed or entered by these projects. Construction and operational impacts would be the same as discussed for the all other alternatives.	Same as No Action Alternative. Where appropriate (based upon project design and project-level environmental analysis, documentation, and review) elevate HCT alignment to allow safe access to shoreline homes and parks that are only accessible by uncontrolled, at-grade rail crossings.
Alternative 2	Ten different jurisdictional shorelines would be crossed or entered by these projects. Construction and operational impacts would be the same as discussed for the all other alternatives.	Same as No Action Alternative. Where appropriate (based upon project design and project-level environmental analysis, documentation, and review) elevate HCT alignment to allow safe access to shoreline homes and parks that are only accessible by uncontrolled, at-grade rail crossings.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Alternative 3	Ten different jurisdictional shorelines would be crossed or entered by these projects. This would include the No Action projects identified previously. Construction and operational impacts would be the same as discussed for the all other alternatives.	Same as No Action Alternative.
Alternative 4	Ten different jurisdictional shorelines would be crossed or entered by these projects. Construction and operational impacts would be the same as discussed for the all other alternatives.	Same as No Action Alternative.
Preferred Alternative	Ten different jurisdictional shorelines would be crossed or entered by these projects. Construction and operational impacts would be the same as discussed for the all other alternatives.	Same as No Action Alternative.
Section 3.12 Transportation No Action Alternative	Three primary criteria were used to evaluate transportation performance: mobility, congestion, and safety. The No Action Alternative involves no additional construction beyond what is planned and committed within the corridor. Congestion and the lack of mobility throughout the region and the I-405 study area have increased rapidly during the past decade, and the causes of congestion - increases in the volume of vehicles and trips - are forecasted to continue to grow in the next 20 years. Under the No Action Alternative, congestion and mobility will continue to degrade for both personal and freight users in the study area. In 2020, the corridor is expected to serve 21 percent more trips and general traffic times are forecast to increase by 25 to 40 percent. As capacity is used up on I-405 and the traffic shifts to local arterials, congestion is expected to increase by 1 to 4 hours along I-405 and up to 2 hours on other freeway and arterial facilities. On average, the No Action peak person demand at the screenlines is forecast to be 34 percent higher in Year 2020 than the 1995 base conditions. This alternative accommodates less person demand than any of the action alternatives. The No Action Alternative volumes would be only about 10 percent higher than the 1995 volumes. Overall, the reliability of travel times would degrade and become much worse than the existing conditions in 1995. The No Action Alternative contains facilities and programs that are extensions of existing conditions, with few unique features that would provide potential for adapting to new technologies or designs. The No Action Alternative does include several applications of ITS that would continue to improve the efficiency of the current system. The compatibility problem between I-405 and local transportation systems would worsen if only the No Action Alternative improvements are undertaken. Committed projects in the No Action Alternative would improve 15 percent of the high accident locations.	The No Action Alternative includes no additional construction beyond what is planned and committed within the corridor. Beside the usual and customary detours and other construction scheduling set for these projects, no additional mitigation is anticipated. Because the No Action Alternative does not include transportation effects beyond the baseline projects, it would not require operations mitigation beyond that already incorporated into these planned and programmed projects.
Alternative 1	This alternative would have the least impact to existing traffic during construction compared to other action alternatives. Travel demand is not very different, and HOV and general traffic times do not change from the No Action Alternative. However, transit travel times would improve substantially with HCT. Travel times could vary from those forecast based on the HCT alignment, technology, and	Each of the action alternatives will require mitigation of construction impacts. Efforts in all cases will be made to maintain existing traffic lanes during construction.

Table S-2:
Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings

Element	Environmental Consequences	Summary of Mitigation
	operational characteristics. Hours of congestion and average travel speeds would remain about the same as under the No Action Alternative. Alternative 1 would improve 32 percent of the high accident locations. Alternative 1 could result in some reduction of peak-period single-occupant trips. Overall, this alternative would improve compatibility between the local and regional transportation systems slightly compared the No Action Alternative, but it would not improve mobility on the local system. This alternative would support improvements on pedestrian and bicycle circulation, reduce traffic congestion slightly, but would not be enough to change hours of congestion, and would result in a slight improvement in number of accidents. Construction of the major fixed-guideway HCT elements of Alternatives 1 and 2 would involve work in the BNSF Railroad right-of-way, as well as on the I-405 freeway and adjacent arterial network. Unlike roadway construction, HCT sections would most likely be opened at one time. Park-and-ride facilities would be dispersed throughout the study area with short-term impacts to local communities.	Depending on the specific project element, one or more of the following construction mitigation measures will be employed for roadway construction: • Providing a construction traffic manager and traffic management team. • Implementing intelligent transportation system (ITS) technologies in advance of and during construction and aimed at increasing vehicle occupancy and reducing travel demand. • Sequencing construction packages to minimize impact to the traveling public. • Coordinating traffic control with local agencies. • Coordinating construction activities with transit agencies, police, fire, and emergency service providers. • Disseminating information to local businesses and the general public through direct mail, radio, and other advertising such as roadway signs, transit billboards, etc. • Maintaining a construction information hot line. • During the design phase, utilizing construction experts to evaluate methods that can shorten contract duration and minimize impacts. • Providing monetary incentives to contractors to shorten construction times. • Allowing full-time road closures to speed construction when appropriate. • Providing construction staging areas and access to work sites that minimize disruption to general traffic. • Holding community information and status report meetings prior to and/or during construction. • Providing remote park-and-ride lots with shuttle transit. • Restricting lane closures and construction activities. • Utilizing moveable barriers for lane closures. • Restricting construction activities during peak holiday travel periods. • Delivering roadbed materials and other components by rail.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		• Using standard designs and construction methods for transit stations that result in quick completion. • Allowing for road closures during non-peak periods to complete critical segments faster. Methods to lessen traffic impacts for HCT segments include the methods described above for roadways, and would also include: • Delivering roadbed materials and other components by rail and/or truck using the HCT right-of-way when feasible. • Using standard designs and construction methods for HCT stations that result in quick completion. Road construction traffic impacts could be mitigated by early construction of an HCT system, which is predicted to be doable a few years before the roadways can be completed, thereby making an alternative mode available during part of the roadway construction period.
Alternative 2	Construction impacts on traffic and transit/HOV mode shares would result from the reduction of lane capacity along I-405. Compared to the No Action Alternative, Alternative 2 would accommodate 15 to 20 percent more demand, general traffic travel times are forecast to improve up to 10 percent, transit travel times would improve substantially, several high accident locations would be improved and total accidents would decrease slightly, duration of congestion would be shorter, the corridor would handle 15 to 20 percent more demand, general traffic travel time reliability would improve, and the compatibility with the regional general purpose transportation network, including truck freight movements, would be much better. Travel times could vary from those forecast based on the HCT alignment, technology, and operational characteristics. Transit usage would increase throughout the corridor, the same as in Alternative 1. TDM actions would encourage more transit and HOV use. Congestion would improve by around 1 hour per day for all facilities; some segments on I-405 could improve by 3 to 5 hours. The average travel speeds would improve, minimal available capacity remains after 2020, peak-period SOV trips would be reduced by 10 percent, 60 percent of the high accident locations would improve. Overall, this alternative would be compatible with local transportation plans.	Same as Alternative 1.

Table S-2:
Summary of Potential Impacts and Possible Mitigation Measures

Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Alternative 3	The duration of construction impacts on traffic would more than double compared to Alternative 2. During the extensive construction period, travel time reliability for general traffic would be difficult to manage. Compared to the No Action Alternative, Alternative 3 would handle 25 to 30 percent more demand, general traffic travel times would improve up to 15 percent, transit travel times would improve substantially with HCT showing slightly less improvement than Alternatives 1 and 2, congestion would improve on I-405 by about 3 hours per day, accident hot spots are reduced, and total accidents are expected to decrease, and higher levels of general traffic travel time reliability are expected. Alternative 3 would result in substantial increases in Year 2020 peak-period travel demand across the three major screenlines within the study area. The expansions of I-405 mainline capacity under this alternative would improve general traffic reliability. Taken as a whole, the transit and TDM strategies contained in Alternative 3 could result in a reduction of peak-period single-occupant trips in the 10 percent range. Overall, the transit system compatibility with the regional system would be much better in Alternative 3 than under the No Action Alternative.	Same as Alternative 1, except that roadbed materials and other BRT components likely will not be delivered by rail since the BRT is proposed to operate within the I-405 right-of-way. However, opportunities for mitigating construction related traffic impacts prior to roadway construction through early implementation of TDM and transit investments necessary to provide alternative means and routes for travel in the impacted sections are being considered.
Alternative 4	Overall, more lane miles of existing roadways would be exposed to construction. Six lanes of roadway capacity in the I-405 corridor would have substantial impacts on traffic compared to the other alternatives. Compared to the No Action Alternative, Alternative 4 would accommodate 30 to 35 percent more demand, general traffic travel times would improve up to 20 percent, transit times would improve by 5 to 8 percent with minimal new transit facilities, transit and HOV usage would remain about the same, general purpose traffic, including freight, would benefit greatly. Transit would continue to operate in the HOV lanes. The transit travel time reliability could be maintained at existing levels, depending upon how the lanes would be managed to avoid overcrowding. Alternative 4 would have available capacity remaining after 2020, the greatest improvement in general purpose traffic travel time among the action alternatives. Overall, Alternative 4 would have high levels of compatibility with local transportation plans similar to Alternatives 2 and 3. The regional and local system compatibility problems existing in the No Action Alternative would be reduced or largely eliminated. The hours of traffic congestion with facility improvements would be the same as or slightly less than Alternative 3. The hours of congestion would improve substantially over the No Action Alternative. Alternative 4 would improve two-thirds of the high accident locations.	Same as Alternative 1, except that roadbed materials and other HCT components likely will not be delivered by rail since Alternative 4 does not propose an HCT facility.
Preferred Alternative	The duration of construction impacts of traffic would be more extensive than Alternatives 1 and 2, but similar to Alternative 3. During the construction period, travel time reliability for general traffic would be difficult to maintain. Compared to the No Action Alternative in Year 2020, general traffic travel times would be reduced up to 14 percent, transit travel times would improve substantially with the BRT, and congestion would be reduced on I-405 by about 3 hours per day. Accident hot spots would be reduced; total accidents are expected to be similar to the No Action Alternative, and higher levels of general traffic travel time reliability are expected. The Preferred Alternative would accommodate an increase in Year 2020 peak-period travel of approximately 25 to 30 percent across the three major screenlines within the study area. The transit and TDM strategies could result in a reduction of peak-period single-occupant trips in the 10 percent range. Overall, the transit system compatibility with the regional system would be much better for the Preferred Alternative than under	Same as Alternative 3.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
	the No Action Alternative.	
Section 3.13 Land Use		
No Action Alternative	The direct impacts of the No Action Alternative projects are, or will be, addressed in the environmental analysis, documentation, and review conducted for those projects.	Mitigation measures for direct impacts are identified in Section 3.14.
Alternative 1, 2, 3, 4 and Preferred Alternative	Analysis of direct land use impacts are presented in the Displacements and Right-of-Way Acquisitions Section 3.14.	Mitigation measures for direct impacts are identified in Section 3.14.
Section 3.14 Displacements and Right-Of-Way Acquisition		
No Action Alternative	Although the No Action Alternative would have right-of-way acquisitions, the specific acquisitions and consequences are, or will be, addressed in the environmental documentation for the already committed projects.	Mitigation is the same as for all the action alternatives. See below.
Alternative 1	The approximately 1,000 estimated potential right-of-way (above the No Action Alternative) parcel acquisitions under Alternative 1 are estimated at 25 million square feet or approximately 580 acres. The HCT projects located on BNSF right-of-way are excluded from the parcel calculations because the large number of BNSF parcels would skew the outcome. Potential residential and commercial displacements would be 360 and 30, respectively.	The right-of-way acquisition program in the State of Washington parallels that of the Federal Government when federal funds are involved. The Uniform Relocation Assistance and Real Property Policies Act of 1970 requires that all property proposed for acquisition be appraised at its fair market value as the basis for the purchase offer. Some owners may also receive relocation compensation. WSDOT will make all attempts to avoid acquiring properties or displacing residents. Where avoidance is not reasonable or feasible, regulations will be followed to minimize impacts.
Alternative 2	The approximately 1,600 estimated potential right-of-way parcel acquisitions under Alternative 2 are estimated at 34 million square feet or approximately 770 acres. The HCT projects located on BNSF right-of-way are excluded from the parcel calculations because the large number of BNSF parcels would skew the outcome. Potential residential and commercial displacements would be 450 and 100, respectively.	Same as Alternative 1.
Alternative 3	The approximately 1,400 estimated potential right-of-way parcel acquisitions under Alternative 3 are estimated at 17 million square feet or approximately 400 acres. Potential residential and commercial displacements would be 330 and 110, respectively.	Same as Alternative 1.
Alternative 4	The approximately 1,300 estimated potential right-of-way parcel acquisitions under Alternative 4 are estimated at 19 million square feet or approximately 440 acres. Potential residential and commercial displacements would be 280 and 80, respectively.	Same as Alternative 1.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Preferred Alternative	The approximately 1,600 estimated potential right-of-way parcel acquisitions under the Preferred Alternative are estimated at 31 million square feet or approximately 730 acres. Potential residential and commercial displacements would be 400 and 150, respectively.	Same as Alternative 1.
Section 3.15 Social Impacts No Action Alternative	Construction activities would generate neighborhood impacts primarily from temporary traffic changes and noise impacts. The No Action Alternative would have the greatest long-term social impact because of worsening traffic conditions and associated noise and accessibility impacts. Increases in traffic from the No Action Alternative would hinder social interaction and would result in low community cohesion impacts. Arterial improvements could increase physical barriers to social interaction.	No mitigation measures are necessary.
Alternative 1	This alternative would have the least impact to existing traffic during construction compared to other action alternatives because much of the fixed-guideway HCT alignment is separated from existing roadways. Alternative 1 would have low impacts to neighborhood community cohesion and social interaction throughout the corridor. Cities such as Bellevue, Redmond, and Renton would face the greatest potential for impacts due to traffic and land use influences. Other cities, such as Kent and Bothell, would have negligible impacts from the proposed improvements. Some social interaction impacts may be offset over the long term by the presence of high-capacity transit stations.	Implementation of proposed mitigation measures listed for impacts to displacements, traffic, noise, visual quality, and land use will help reduce overall impacts on neighborhoods and will be implemented where appropriate and practicable.
Alternative 2	There would be slightly more construction noise than in Alternative 1. Alternative 2 would have the lowest social impact throughout the corridor, but would not be substantially better than the other three action alternatives. Bellevue would experience the most impacts of all cities; Kenmore, Woodinville, Newcastle, and unincorporated parts of King and Snohomish counties would have slightly beneficial impacts. Overall effects on community cohesion and social interaction would be low. Some social interaction impacts may be offset over the long term by the presence of high-capacity transit stations.	Same as Alternative 1.
Alternative 3	The scale of proposed improvements (particularly on I-405) in Alternative 3 would increase the duration and extent of construction impacts throughout the corridor. The duration of traffic impacts would more than double compared to Alternatives 1 and 2 because of the additional lane miles that would be under construction. Noise levels would be roughly the same as in Alternatives 1 and 2; however, most noise would be associated with I-405 improvements. There would be no construction of the HCT in the BNSF right-of-way. Alternative 3 would have slightly lower impacts on neighborhood community cohesion than Alternative 2. Overall effects on community cohesion and social interaction would be low. Bellevue and Kirkland would likely experience the greatest impacts due to a heavy concentration of improvements within their respective jurisdictions. Cities located farther away from I-405 than	Same as Alternative 1.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
	Bellevue and Kirkland, such as Redmond and Woodinville, would see only a slight improvement over the No Action Alternative conditions. Benefits related to transit stations would be less in Alternative 3 since this alternative would have fewer stations than Alternatives 1 and 2.	
Alternative 4	Alternative 4 would have the most long-term and extensive construction impacts of all alternatives. Adding six lanes of roadway capacity in the I-405 corridor would have substantial impacts on traffic compared to the other alternatives because of the extensive use of grade- and barrier-separated alignments, especially in the southern portion of I-405 between Tukwila and the I-90 interchange. There would be more construction noise in the I-405 corridor under Alternative 4 than any of the other alternatives because of construction of the express lanes. However, because these impacts would be primarily within existing transportation corridors, impact to neighborhoods would not be substantial. The net level of social impact caused by the operation of Alternative 4 improvements would be similar to Alternative 1. Overall effects on community cohesion and social interaction would be low. Similar to Alternative 3, Kirkland and Bellevue would experience the greatest impacts due to a high concentration of improvements. Woodinville and Redmond would have net benefits to community cohesion mainly because of traffic improvements and limited displacement and noise impacts.	Same as Alternative 1.
Preferred Alternative	The Preferred Alternative would have mostly similar impacts on neighborhood community cohesion compared to Alternative 3. Bellevue, Redmond, and Kirkland would likely have the greatest impacts due to a heavy concentration of improvements within their respective jurisdictions. Areas farther away from I-405 than these cities, such as Woodinville and unincorporated King County, would see a slight improvement over the No Action Alternative conditions similar to Alternative 3. The Preferred Alternative would have a level of transit benefits similar to Alternative 3.	Same as Alternative 1.
Section 3.16 Economic Impacts No Action Alternative	Under the No Action Alternative, there would be relatively little impact on local businesses during construction because of the relatively few committed transportation improvements in this alternative.	No mitigation required.
Alternative 1	Alternative 1 would have the lowest direct property tax impacts of the action alternatives. Impacts would be somewhat less than those of Alternatives 2 and 3 and much less than those of Alternative 4. Alternative 1 would have the fewest localized business impacts of the action alternatives. Compared to the other alternatives, the greatest localized business impacts would be those associated with the fixed-guideway HCT system in the area from SeaTac to Renton's central business district.	No mitigation required.
Alternative 2	Alternative 2 would have somewhat greater property tax impacts than Alternative 1 . Alternative 2 would result in similar but greater impacts to local businesses compared to Alternative 1.	No mitigation required.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Alternative 3	Alternative 3 would have somewhat greater property tax impacts than Alternative 1, but similar to Alternative 2. Alternative 3 would have greater localized business impacts than Alternatives 1 and 2, but less than Alternative 4.	No mitigation required.
Alternative 4	Alternative 4 would have the largest direct property tax impact of the alternatives. Alternative 4 would result in the greatest potential impacts to local businesses. The impact that differentiates Alternative 4 from the other action alternatives would be the construction of the six new lanes along the I-405 corridor. There would be substantial localized impacts near expressway access locations in the business districts of Renton, Tukwila, and Kirkland.	No mitigation required.
Preferred Alternative	The Preferred Alternative would have slightly greater property tax impacts than Alternative 3. Localized business impacts are expected to be greater than Alternative 3 because of modified access during construction and increased right-of-way acquisition associated with the expanded arterial capacity in Redmond, Bothell, Kirkland, and Tukwila.	No mitigation required.
Section 3.17 Recreation		
No Action Alternative	Two public parks and trails for a total of less than 1 acre would be potentially impacted. Construction impacts to the public parks and trails range from temporary erosion/sedimentation to dust, noise, and temporary access issues. These temporary impacts are related to construction vehicles, potential interim traffic detours, and general construction activity. The potential operational impacts of the No Action Alternative would be the result of increased acquisition, noise, air, and vehicular traffic to the parks. Access, parking, and overall interior circulation could be impacted. The impact of the acquisition may be considered substantial to Sammamish River Trail. Replacement or enhancement of the remaining park functions would be evaluated as part of the environmental review conducted for the No Action projects.	Baseline mitigation measures to avoid or reduce impacts would be temporary erosion/sedimentation control, water quality measures, replacement (or enhancement of functions) of parkland/trail, protection of substantial trees, project design to reduce the area of impacts, and realignment of affected trails. Additionally, defined traffic control (auto and pedestrian) measures to lessen the impacts to the park functions during construction will be considered during project design. General mitigation measures are identified in Appendix H.
Alternative 1	Construction and operational impacts are similar to other alternatives except two public parks and trails would be impacted by acquisition for a total of less than 1 acre, and 14 parks would be impacted by proximity effects. Most substantial impacts would be to Mercer Slough Nature Park and Sammamish River Trail.	Same as No Action Alternative.
Alternative 2	Construction and operational impacts are similar to other alternatives with three public parks and trails impacted by acquisition for a total of approximately 2 acres, and 18 parks impacted by proximity effects. Most substantial are Mercer Slough Nature Park, and to a lesser extent, Cedar River Interpretive Trail and Park and Sammamish River Trail.	Same as No Action Alternative.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Alternative 3	Construction and operational impacts are similar to other alternatives with three public parks and trails impacted by acquisition for a total of approximately 2 acres, and 12 parks impacted by proximity effects. Most substantial are Mercer Slough Nature Park, Cedar River Interpretive Trail and Park, and Sammamish River Trail.	Same as No Action Alternative.
Alternative 4	Construction and operational impacts are similar to other alternatives with three public parks and trails impacted by acquisition for a total of approximately 2 acres, and 11 parks impacted by proximity effects. Most substantial are Mercer Slough Nature Park, Cedar River Interpretive Trail and Park, and Sammamish River Trail.	Same as No Action Alternative.
Preferred Alternative	Construction and operational impacts are similar to other alternatives with three public parks and trails impacted by acquisition for a total of approximately 2 acres, and 12 parks impacted by proximity effects. Most substantial are Mercer Slough Nature Park, Cedar River Interpretive Trail and Park, and Sammamish River Trail.	Same as No Action Alternative.
Section 3.18 Public Services No Action Alternative	No public services would be potentially impacted. In some instances, detour route contingency plans would need to be developed and implemented to during construction address temporary road closures and/or lane restrictions. During operation, increased usage of new and improved roadway elements and transit facilities would slightly increase the potential for accidents. Some increase in theft and/or vandalism also could occur at new or expanded transit centers and parking areas. Planned intelligent transportation system improvements would also include enhanced capability to facilitate movement of emergency vehicles through congested areas and improve existing incident response in the corridor. Overall pedestrian and bicycle safety would also be enhanced by the non-motorized transportation system improvements to be constructed by this alternative.	Potential mitigation measures for public services proposed as part of all alternatives include developing contingency plans for temporary interruptions of access or services and contacting police, fire, emergency, and school transportation service providers to address possible temporary disruptions in service during construction, and to ensure that emergency and school transportation access would be maintained.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Alternatives 1, 2, 3, 4	Public services are similar to the No Action Alternative, and none would be impacted substantially.	Same as No Action Alternative.
Preferred Alternative	Public services are similar to the No Action Alternative, and none would be impacted substantially.	Same as No Action Alternative.
Section 3.19 Utilities No Action Alternative	Potential impacts include relocation of existing utilities and potential temporary interruptions of service. Impacts could occur for: 4 water lines, 4 sewer lines, 2 fuel pipelines, and 8 electric transmission lines. Operation of the No Action Alternative is not anticipated to have any direct effect on the major utilities.	Mitigation for the No Action Alternative improvements is addressed through the environmental documentation prepared for those improvements.
Alternative 1	Impacts could occur for: 17 water lines, 32 sewer lines, 16 fuel pipelines, and 27 electric transmission lines. Operation of Alternative 1 is not anticipated to have any direct effect on the major utilities.	If conflict with utilities cannot be avoided through project design, typical impact mitigation would include relocation of the above-ground utilities.
Alternative 2	Impacts could occur for: 29 water lines, 55 sewer lines, 28 fuel pipelines, and 40 electric transmission lines. Operation of Alternative 2 is not anticipated to have any direct effect on the major utilities.	Same as Alternative 1.
Alternative 3	Impacts could occur for: 25 water lines, 44 sewer lines, 25 fuel pipelines, and 30 electric transmission lines. Operation of Alternative 3 is not anticipated to have any direct effect on the major utilities.	Same as Alternative 1.
Alternative 4	Impacts could occur for: 29 water lines, 44 sewer lines, 30 fuel pipelines, and 36 electric transmission lines. Operation of Alternative 4 is not anticipated to have any direct effect on the major utilities.	Same as Alternative 1.
Preferred Alternative	Impacts could occur for: 24 water lines, 38 sewer lines, 23 fuel pipelines, and 30 electric transmission lines. Operation of the Preferred Alternative is not anticipated to have any direct effect on the major utilities.	Same as Alternative 1.
Section 3.20 Visual Quality No Action Alternative	The baseline projects contained in the No Action Alternative would result in long-term visual impacts independent of the I-405 Corridor Program, and the effects of those projects would be addressed through the environmental analysis, documentation, and review completed for the individual projects. Under the No Action Alternative, nine projects would affect visual resources and views to or from I-405. Most construction impacts to visual resources are considered to be temporary and relatively short-lived. Typical impacts include additional pavement, glare from light fixtures, more parked cars, and removal of existing vegetation.	Where appropriate and practicable, mitigation measures such as the following will be employed to partially or fully mitigate the adverse visual impacts of the major transportation elements of the alternatives: • Realigning or modifying routes • Minimizing clearing • Planting appropriate vegetation

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		• Screening or opening up views • Grading slopes to blend with the natural topography • Employing wide-span bridge crossings • Enhancing the architectural design of project features • Shielding roadway light fixtures • Replacing street trees to provide screening for high quality visual resources and high viewer sensitivity • Where feasible and reasonable, acquiring sufficient right-of-way for plantings • Designing gateway markers at the visual entrances to cities • Use of low ground covers and deciduous trees • Providing perimeter fencing and landscape buffering around parking and transit center lots • Darkening concrete surfaces to aid in reducing reflective sunlight glare • Planting medians and the perimeters of parking lots to reduce headlight glare
Alternative 1	Construction and operational impacts for Alternative 1 would be similar to those described for the No Action Alternative. Alternative 1 includes five major elements that may affect visual resources: (1) physically separated, fixed-guideway high-capacity transit, (2) HOV express with direct-access ramps, (3) park-and-ride capacity expansions, (4) transit center capacity improvements, and (5) pedestrian and bicycle improvements. Impacts may also include removal of existing vegetation, and additional headlight glare from additional traffic.	Same as No Action Alternative.
Alternative 2	Construction and operational impacts for Alternative 2 would be similar to those described for the No Action Alternative. Alternative 2 includes eight major elements that may affect visual resources: (1) physically separated, fixed-guideway high-capacity rail transit, (2) HOV express with direct-access ramps, (3) park-and-ride capacity expansions, (4) transit center capacity improvements, (5) one general purpose lane in each direction on I-405, (6) I-405 collector-distributor lanes, (7) capacity improvements on freeways connecting to I-405, and (8) pedestrian and bicycle improvements. Impacts may also include removal of existing vegetation, and additional headlight glare from additional traffic.	Same as No Action Alternative.
Alternative 3	Construction and operational impacts for Alternative 3 would be similar to those described for the No Action Alternative. Alternative 3 includes seven elements that may affect visual resources: (1) HOV express lanes with direct-access ramps, (2) park-and-ride capacity expansions, (3) transit center capacity improvements, (4) two general purpose lanes in each direction on I-405, (5) I-405 collector-distributor lanes, (6) capacity improvements on freeways connecting to I-405, and (7) pedestrian and	Same as No Action Alternative.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
	bicycle improvements. Impacts may also include removal of existing vegetation, and additional headlight glare from additional traffic.	
Alternative 4	Construction and operational impacts for Alternative 4 would be similar to those described for the No Action Alternative. Alternative 4 includes eight elements that may affect visual resources: (1) HOV express lanes with direct-access ramps, (2) park-and-ride capacity expansions, (3) transit center capacity improvements, (4) one general purpose lane in each direction on I-405, (5) I-405 collector-distributor lanes, (6) two express lanes in each direction in the I-405 corridor, (7) capacity improvements on freeways connecting to I-405, and (8) pedestrian and bicycle improvements. Impacts may also include removal of existing vegetation, and additional headlight glare from additional traffic.	Same as No Action Alternative.
Preferred Alternative	Construction impacts for the Preferred Alternative would be similar to those described for the No Action Alternative. Operational impacts for the Preferred Alternative would be similar to those described for Alternative 3.	Same as No Action Alternative.
Section 3.21 Historic, Cultural, and Archeological Resources No Action Alternative	The No Action Alternative has the least potential to adversely affect historic properties, archaeological resources, and archaeological high probability areas (HPAs) of any alternative . No previously recorded archaeological sites appear to be affected by this alternative. This alternative encroaches on 6 of 20 identified HPAs.	General mitigation measures for archaeological resources may include archaeological monitoring, subsurface testing, and data recovery. Archaeological monitoring could be warranted where construction is scheduled in areas of high probability for containing archaeological sites (but which exhibit no outward indications that such sites are actually present). Archaeological monitoring may also be warranted where pre-construction subsurface testing is not feasible. General mitigation measures for historic resources will include, but are not limited to: • Designing the project to avoid or limit physical alteration, visual, atmospheric, or long-term noise impacts; • Relocating historic resources to appropriate new sites; and/or • Modifying construction methods to avoid or limit construction-related impacts. Once project design development begins, a review process to refine specific project elements could be undertaken in order to minimize visual and other impacts on historic resources and

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		ensure design compatibility with the historic setting and character of individual resources and historic districts. Where operational noise and vibration impacts on historic resources are identified, potential mitigation measures in the form of noise walls may be effective or appropriate if there are no harmful associated visual impacts. Consideration also will be given to other sound-reducing approaches, such as landscape buffers. When impacts cannot be adequately and practicably avoided, and it is necessary to acquire and remove a historic resource, in some cases the resource may be moved to another site. Where construction-related impacts may include physical damage to a building, the introduction of short-term audible, visual, and atmospheric elements that are out of character with the historic resource, or the obstruction of access to the property, construction methods could be modified to avoid or limit these impacts. Mitigation measures to minimize construction-related impacts could include, but are not limited to: • Using rigid support of excavation structures (shoring) to minimize movement of the ground; • Underpinning the building prior to excavation; • Stabilizing the ground through cementitious or chemical grouts, freezing the ground, or other techniques; • Protecting facades of nearby historic buildings from the accumulation of excessive dirt or cleaning in an appropriate manner at the conclusion of construction; • Maintaining access to historic properties, except for unavoidable short periods, during construction; • Locating temporary construction sheds, barricades, and material storage areas so as to avoid obscuring views of historic properties; and/or • Complying with local noise restrictions for construction and equipment operation. In those cases where historic buildings and structures are subject to adverse effects (including removal or demolition) mitigation will include such measures as recording the contributing buildings, structures, and other features associated with the endangered historic property in accordance with the standards of the Washington SHPO and local consulting parties

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		regarding both requirements and repository, as appropriate. Finished documentation packages would be provided to the Washington SHPO and local consulting parties. During future project-level environmental analysis, documentation, and review, the presence/absence of tribal cultural resources will be determined in consultation with local Indian tribes. Government-to-government consultations between WSDOT, FHWA and the local Indian tribes have not yet resulted in an inventory of tribal cultural resources in the project area. However, WSDOT has initiated a cultural resources study for urban corridor projects, including the I-405 Corridor Program, and will further identify tribal cultural resources and mitigation measures.
Alternative 1	Alternative 1 could affect considerably fewer recorded properties than Alternatives 2, 3, and 4, and the Preferred Alternative, and it would have the lowest potential effect on properties over 50 years of age of the action alternatives. This alternative could encroach on 13 of 20 identified archaeological HPAs.	Same as No Action Alternative.
Alternative 2	Alternative 2 could affect the second highest number of recorded properties, and would have the fourth highest number of properties over 50 years of age that potentially would be affected. Two of the three previously recorded archaeological sites could be affected by projects in this alternative. This alternative could encroach on 18 of 20 identified HPAs.	Same as No Action Alternative.
Alternative 3	Alternative 3 could affect the same number of recorded historic sites as the Preferred Alternative, and would have the second highest number of properties over 50 years of age that potentially would be affected. All three previously recorded archaeological sites could be affected by projects in this alternative. This alternative could encroach on 18 of 20 identified HPAs.	Same as No Action Alternative.
Alternative 4	Alternative 4 could affect one fewer recorded historic site than Alternative 2, but it would have the third highest number of properties over 50 years of age that potentially would be affected. All three previously recorded archaeological sites could be affected by this alternative. This alternative could encroach on 17 of 20 identified HPAs.	Same as No Action Alternative.
Preferred Alternative	The Preferred Alternative would affect the highest number of recorded sites and have the highest number of properties over 50 years of age that potentially would be affected. All three previously recorded archaeological sites could be affected by projects in this alternative. This alternative could encroach on 18 of 20 identified HPAs.	Same as No Action Alternative.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Section 3.22 Hazardous Materials and Wastes No Action Alternative	Construction impacts could include encounters or releases of contaminants or hazardous materials by ground-disturbing or dewatering activities in previously contaminated areas (such as underground storage tank leaks), demolition of structures containing asbestos or lead-based paint, and releases of hazardous substances during construction, such as spills of fuels needed for heavy equipment operation. No substantial impacts were identified during the analysis. Potential impacts were determined to be not substantial because there are existing regulations and standard procedures that protect human health and the environment. Operational impacts include a potential for release to the environment of hazardous substances used or transported during routine operation and maintenance of the corridor. No substantial operational impacts were identified during the analysis based on relative comparison of operational impacts for the major elements of the alternatives.	Environmental regulations in place require the appropriate management of contaminated media such as soil or groundwater, require strict control and management of hazardous wastes, and establish criteria for transportation of hazardous substances. Although hazardous material and waste impacts have only been identified at the programmatic level, the following mitigation measures will apply where appropriate to the project. • Acquire additional information regarding the nature and extent of contamination at the identified sites for specific project actions. • Conduct modified environmental site assessments or transaction screening evaluations for sites located adjacent to the project sites and rights-of-way. The site assessment would include a review of existing environmental conditions with a focus on the potential for offsite contamination by groundwater or surface water. • Conduct additional studies to determine if asbestos-containing materials or lead-based paint are present in structures prior to demolition activities. An approved contractor will be designated to conduct the abatement portion of the demolition for the buildings that contain asbestos or lead-based paint. • Conduct additional studies to locate undocumented underground storage tanks and fuel lines prior to construction. Underground storage tanks located within the project site would be permanently decommissioned and properly removed before general construction activities are started, if applicable. • Identify any utilities that need to be relocated. Electrical transformer oil, considered as a hazardous substance under state regulations, will be handled carefully in order to avoid a release or accidental spill during the relocation of transformers. • Design projects to help prevent additional future release of toxics to the environment.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
		• Phase construction activities in concert with any needed cleanup activities to avoid contaminated areas. • Implement construction techniques that minimize disturbance to the subsurface and prevent the transport of contaminants to uncontaminated areas. These techniques will address installation of piling, dewatering activities, site grading and excavation, and stormwater pollution prevention. • Prepare a comprehensive Hazardous Substance Management Plan and a worker Health and Safety Plan that would minimize the effects of identified and unanticipated hazardous substance impacts from contaminated soil and groundwater. • Require contractors selected to do the construction work to follow careful construction practices to protect against hazardous material spills from routine equipment operation during construction. Contractors will be required to submit a Spill Prevention, Control, and Countermeasure Plan for WSDOT projects, as required by WSDOT Standard Specification 1-07.15. The contractor also will be required to be familiar with proper hazardous material storage and handling and know emergency procedures, including proper spill notification and response requirements.
Alternative 1	The alternatives with larger construction areas are expected to have greater construction impacts. Alternative 1 has the smallest construction area of the action alternatives, and would therefore have the least potential impacts. It is roughly the same as the No Action Alternative. Operational impacts of Alternative 1 are similar to those for the No Action Alternative.	Same as No Action Alternative.
Alternative 2	Alternative 2 has an expected construction area larger than Alternative 1 and smaller than the Preferred Alternative and Alternatives 3 and 4. Operational impacts of Alternative 2 are similar to those for the No Action Alternative.	Same as No Action Alternative.
Alternative 3	Alternative 3 has the third-largest expected construction area, but is generally similar to the Preferred Alternative and Alternative 4. Operational impacts of Alternative 3 are similar to those for the No Action Alternative.	Same as No Action Alternative.

Table S-2: Summary of Potential Impacts and Possible Mitigation Measures		
Summary of Findings		
Element	**Environmental Consequences**	**Summary of Mitigation**
Alternative 4	Alternative 4, General Capacity, has the greatest expected construction area, but is generally similar to the Preferred Alternative and Alternative 3. Operational impacts of Alternative 4 are similar to those for the No Action Alternative.	Same as No Action Alternative.
Preferred Alternative	The Preferred Alternative has the second-largest expected construction area, but is generally similar to Alternatives 3 and 4. Operational impacts of the Preferred Alternative are similar to those for the No Action Alternative.	Same as No Action Alternative.
(Note: Impacts of the action alternatives include those of the No Action Alternative. The No Action Alternative includes committed or funded capital improvement projects belonging to cities, counties, Sound Transit, and WSDOT. Therefore, mitigation for the No Action Alternative impacts may not be implemented by WSDOT as part of the I-405 Corridor Program.)		

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