



Exhibit 22. Acres of Permanent Vegetation Removal and Shading by Cover Type in Seattle for the Original 6-Lane Alternative and 6 Lanes with Pacific Street Interchange Option

Area, Cover Type, and Habitat Type <sup>a</sup>	Original 6-Lane Alternative			6 Lanes w/ Pacific Street Interchange Option		
	Direct Removal	Shading <sup>b</sup>	Total	Direct Removal	Shading <sup>b</sup>	Total
<b>Parks and Other Protected Areas</b>						
Deciduous and/or Coniferous Trees	0.81	1.12	<b>1.93</b>	0.37	1.50	<b>1.87</b>
Shrub/Grass	2.89	0.33	<b>3.22</b>	1.42	0.80	<b>2.22</b>
Wetland	0.13	1.62	<b>1.75</b>	0.16	3.40	<b>3.56</b>
<b>Total</b>	<b>3.83</b>	<b>3.07</b>	<b>6.90</b>	<b>1.95</b>	<b>5.70</b>	<b>7.65</b>
<b>Open Water<sup>c</sup></b>						
Wetland	0.11	4.60	4.71	0.04	4.08	4.12
<b>Urban Matrix</b>						
Deciduous and/or Coniferous Trees	3.93	0.82	<b>4.75</b>	4.73	0.64	<b>5.37</b>
Shrub/Grass	7.35	1.29	<b>8.64</b>	4.21	1.53	<b>5.74</b>
Wetland	0.02	0.44	<b>0.46</b>	0.02	0.37	<b>0.39</b>
<b>Total</b>	<b>11.30</b>	<b>2.55</b>	<b>13.85</b>	<b>8.96</b>	<b>2.54</b>	<b>11.50</b>
<b>Total</b>	<b>15.24</b>	<b>10.22</b>	<b>25.46</b>	<b>10.95</b>	<b>12.32</b>	<b>23.27</b>

Note: Affected areas were calculated using Global Positioning System (GPS) data gathered in the field, aerial photography, National Wetland Inventory Maps, and local wetland inventories. Affected areas are based on preliminary design information and are subject to change.

<sup>a</sup> The Lake Washington portion of the project area contains only open water habitats lacking wetland vegetation, therefore, effects on vegetation would not occur in these areas.

<sup>b</sup> Within the shaded areas there would be small pockets of vegetation removed at each of the column locations. This is in addition to the vegetation removal areas reported elsewhere in this exhibit.

<sup>c</sup> The Open Water cover type contains wetlands as well as solely open water areas that lack wetland vegetation. Because vegetation removal is not relevant to these non-wetland open water areas, their acreages are not displayed in this exhibit.

### **6 Lanes with Pacific Street Interchange Option**

The presence of the Union Bay Bridge and associated traffic could affect bird use and behavior in the vicinity due to noise, visual disturbance, and the physical obstruction to flight that the bridge may cause. Where the bridge crosses over Marsh Island, wildlife would be affected by noise and visual disturbance.

The increased width of the Pacific Street interchange relative to the original 6-Lane Alternative could affect flight behavior of birds in the area (Exhibit 8). Actual effects on individual bird species would likely depend on hunting style and flying style (lower flying birds versus higher flying birds).



### **Second Montlake Bridge Option**

The Second Montlake Bridge option may include slightly greater disturbance to wildlife than the original 6-Lane Alternative because wildlife may avoid the area underneath the second bridge. In addition, the second Montlake Bridge has the potential to be an obstruction to flying birds. However, given that a bridge already is present in the area, the second, adjacent bridge would be expected to have little additional effect to flying birds. Additional noise from the second bridge would not be expected to affect wildlife because wildlife in the area has already adapted to traffic noise on the existing Montlake Bridge.

### **What are the permanent effects on federally listed species and federal species of concern?**

Highway noise levels under the 6-Lane Alternative options would be similar to the original 6-Lane Alternative; therefore, potential disturbance to federally listed species and federal species of concern would also be similar. Differences in elevated roadway and bridge height in some locations among some of the options would create slight differences in obstructions to flying bald eagles and peregrine falcons. Note that the previous section of this report describes differences in obstructions and barriers between the Seattle project area 6-Lane Alternative options. Most of the suitable bald eagle nesting and perching trees are located outside the project footprint and would not be affected by any of the 6-Lane Alternative options.

### **What are the permanent effects on state-listed or other state priority species?**

The effects of noise disturbance on state-listed and priority birds from the 6-Lane Alternative options would be similar to the original 6-Lane Alternative because the anticipated highway noise levels under the original 6-Lane Alternative and the options would be similar. Differences between the Seattle project area 6-Lane Alternative options in obstructions and barriers to state-listed or other state-priority birds would be the same as described above for other birds.

## **Eastside**

### **South Kirkland Park and Ride Transit Access – 108th Avenue Northeast Option**

#### ***What are the effects of vegetation removal and shading on wildlife habitat?***

Exhibit 25 shows the cover types that would be affected by the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option. This option would remove approximately 2.3 acres more





- Park Within 1/4 mile of Project Area
- Second Montlake Bridge Option Footprint

**Cover Types Effects**

**Parks and Other Protected Areas**

- Temporary shading of existing vegetation
- Permanent shading of existing vegetation
- Permanent removal of existing vegetation

\*Permanent removal of existing vegetation would occur in areas where the roadway or associated facility is at-grade. Shading effects would occur where the roadway or associated facility is elevated.

**Open Water**

- Temporary shading
- Permanent shading

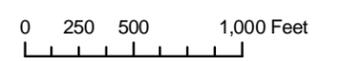
**Urban Matrix**

- Temporary shading of existing vegetation
- Permanent shading of existing vegetation

\*Permanent removal of existing vegetation within Urban Matrix would also occur within the permanent footprint area. These areas are not assigned a color but can be inferred from the aerial photo.

NOTES: Pile driving would occur in all elevated roadway areas.

Source: City of Seattle (2003) GIS Data (aerial photo and parks); Parametrix (2004) CAD data (footprint boundary). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.



**Exhibit 23. Effects of Second Montlake Bridge Option on Cover Types in the Seattle Project Area**  
SR 520 Bridge Replacement and HOV Project



Exhibit 24. Acres of Permanent Vegetation Removal and Shading by Cover Type in Seattle for the Second Montlake Bridge Option

Area, Cover Type, and Habitat Type <sup>a</sup>	Direct Removal	Shading <sup>b</sup>	Total
<b>Parks and Other Protected Areas</b>			
Deciduous and/or Coniferous Trees	0.79	1.24	<b>2.03</b>
Shrub/Grass	1.44	1.82	<b>3.26</b>
Wetland	0.12	1.73	<b>1.85</b>
<b>Total</b>	<b>2.35</b>	<b>4.79</b>	<b>7.14</b>
<b>Open Water<sup>c</sup></b>			
Wetland	0.12	4.63	4.75
<b>Urban Matrix</b>			
Deciduous and/or Coniferous Trees	3.75	0.9	<b>4.65</b>
Shrub/Grass	6.85	1.35	<b>8.20</b>
Wetland	0.02	0.44	<b>0.46</b>
<b>Total</b>	<b>10.62</b>	<b>2.69</b>	<b>13.31</b>
<b>Total</b>	<b>13.09</b>	<b>12.11</b>	<b>25.20</b>

Note: Affected areas were calculated using GPS data gathered in the field, aerial photography, National Wetland Inventory Maps, and local wetland inventories. Affected areas are based on preliminary design information and are subject to change.

<sup>a</sup> The Lake Washington portion of the project area contains only open water habitats lacking wetland vegetation, and therefore effects on vegetation would not occur in these areas.

<sup>b</sup> Within the shaded areas there would be small pockets of vegetation removed at each of the column locations. This is in addition to the vegetation removal areas reported elsewhere in this exhibit.

<sup>c</sup> The Open Water cover type contains wetlands as well as solely open water areas that lack wetland vegetation. Because vegetation removal is not relevant to these non-wetland open water areas, their acreages are not displayed in this exhibit.

vegetation than the original 6-Lane Alternative (Exhibit 26). The increase in vegetation loss compared to the original 6-Lane Alternative would be primarily in trees and wetlands within the Urban Matrix cover type.

### How would changes in water quality and quantity affect wildlife?

The effect to wildlife, particularly amphibians in Eastside streams, would depend on the location of discharge, existing habitat, and hydrology. Modified peak flows and timing could affect amphibian breeding habitat and breeding success.

As previously discussed in the *Fish Resources* section of this report and in the *Addendum to Water Resources Discipline Report*, the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option would increase new impervious surface in the Eastside project area by 21 percent compared to the original 6-Lane Alternative. All of the increase would occur in the Yarrow Creek Basin. The greater amount of pollution-generating impervious surface from this option as compared to the original 6-Lane Alternative is expected to result in slightly greater



pollutant loading. The effects on stormwater quantity and quality with this option would be identical to the original 6-Lane Alternative for the other Eastside basins (see the *Ecosystems Discipline Report*).

In the Yarrow Creek Basin, all stormwater would be detained and treated before release into Yarrow Creek, so that peak flows would be decreased but the duration of discharge would be longer. With the application of detention and BMPs, however, no differences in the effects on amphibians would be expected.

### **What types of wildlife disturbances would occur as a result of the project?**

The projected noise levels from highway operations and consequent disturbance to wildlife from the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option would be very similar to the original 6-Lane Alternative.

### **How would the project affect barriers and obstructions to animal movement?**

As with the original 6-Lane Alternative, the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option would replace and retrofit culverts and have the same effects on wildlife passage. Barriers to animal movement from fencing and sound walls under this option would be similar to the original 6-Lane Alternative. The original 6-Lane Alternative and this option would include lids (elevated structures constructed over the SR 520 roadway) that wildlife may use to cross over the roadway.

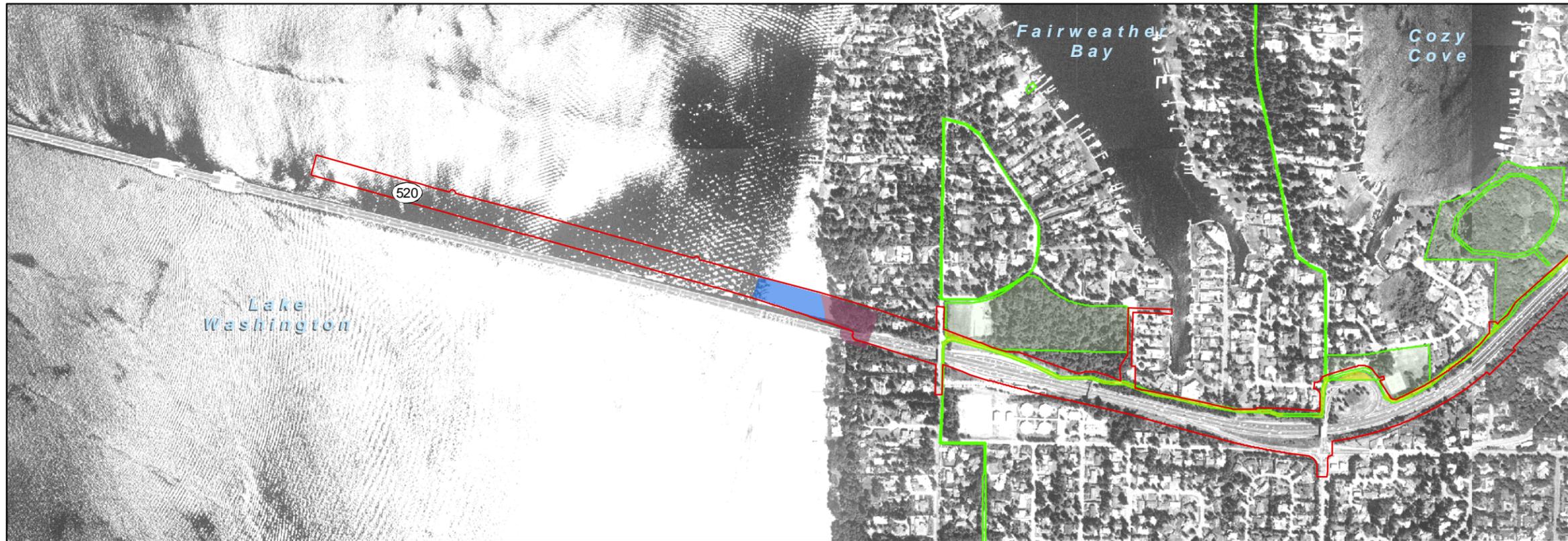
### **How would the project permanently affect federally listed species and federal species of concern?**

As with the original 6-Lane Alternative, highway noise at each of the two Hunts Point bald eagle nest sites is expected to be obscured by other ambient noise under the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option. Consequently, no effects on the Hunts Point bald eagles are expected. The vicinity along the roadway does not provide habitat for wintering bald eagles; therefore, no permanent effects on wintering eagles would occur in this area.

### **How would the project permanently affect state-listed or other state priority species?**

As with the original 6-Lane Alternative, vegetation in the Eastside project area would not be removed in areas that provide habitat for state-listed and priority species under the South Kirkland





South Kirkland Park-and-Ride Transit Access - 108th Ave Northeast Option Footprint

Park Within 1/4 mile of Project Area

**Cover Types Effects**

**Parks and Other Protected Areas**

Permanent removal of existing vegetation

\*Permanent removal of existing vegetation would occur in areas where the roadway or associated facility is at-grade. Shading effects would occur where the roadway or associated facility is elevated.

**Open Water**

Permanent shading

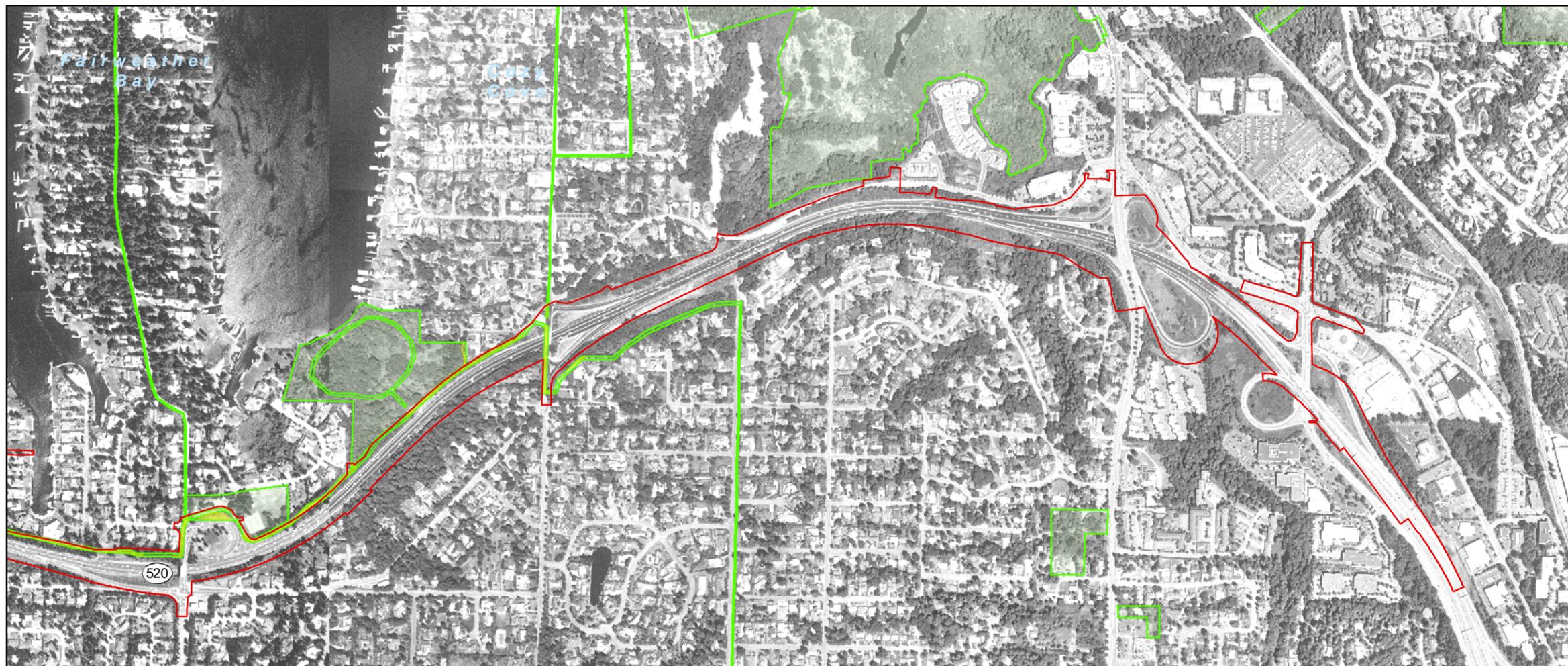
**Urban Matrix**

Permanent shading of existing vegetation

\*Permanent removal of existing vegetation within Urban Matrix would also occur within the permanent footprint area. These areas are not assigned a color but can be inferred from the aerial photo.

NOTES: Pile driving would occur in all elevated roadway areas.

Source: City of Seattle (2003) GIS Data (aerial photo and parks). Horizontal datum for all layers is NAD83(91), vertical datum for layers is NAVD88.



0 250 500 1,000 Feet

**Exhibit 25. Effects of South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast on Cover Types in the Eastside Project Area**  
SR 520 Bridge Replacement and HOV Project





Exhibit 26. Acres of Permanent Vegetation Removal and Shading by Cover Type on the Eastside for South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast Option

Area, Cover Type, and Habitat Type <sup>a</sup>	Original 6-Lane Alternative			South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast		
	Direct Removal	Shading <sup>b</sup>	Total	Direct Removal	Shading <sup>b</sup>	Total
<b>Parks and Other Protected Areas</b>						
Deciduous and/or Coniferous Trees	1.37	0	<b>1.37</b>	1.23	0	<b>1.23</b>
Shrub/Grass	1.20	0	<b>1.20</b>	1.20	0	<b>1.20</b>
Wetland	0.04	0	<b>0.04</b>	0.04	0	<b>0.04</b>
<b>Total</b>	<b>2.61</b>	<b>0</b>	<b>2.61</b>	<b>2.47</b>	<b>0</b>	<b>2.47</b>
<b>Urban Matrix</b>						
Deciduous and/or Coniferous Trees	17.89	1.26	<b>19.15</b>	18.76	1.26	<b>20.02</b>
Shrub/Grass	10.8	0	<b>10.8</b>	11.12	0	<b>11.12</b>
Wetland	6.3	0	<b>6.3</b>	7.58	0	<b>7.58</b>
<b>Total</b>	<b>34.99</b>	<b>1.26</b>	<b>36.25</b>	<b>37.46</b>	<b>1.26</b>	<b>38.72</b>
<b>Total</b>	<b>37.60</b>	<b>1.26</b>	<b>38.86</b>	<b>39.93</b>	<b>1.26</b>	<b>41.19</b>

Note: Affected areas were calculated using GPS data gathered in the field, aerial photography, National Wetland Inventory Maps, and local wetland inventories. Affected areas are based on preliminary design information and are subject to change.

<sup>a</sup>The Lake Washington portion of the project area contains only open water habitats lacking wetland vegetation; therefore, effects on vegetation would not occur in these areas.

<sup>b</sup>Within the shaded areas there would be small pockets of vegetation removed at each of the column locations. This is in addition to the vegetation removal areas reported elsewhere in this exhibit.

Park-and-Ride Transit Access – 108th Avenue Northeast option. In areas where suitable habitat for these species is located near the highway (e.g., Wetherill Park), a decrease in noise levels under the original 6-Lane Alternative and this option could slightly reduce noise disturbance to these species.

### How would the project permanently affect other species of special interest that occur in the project area?

As with the original 6-Lane Alternative, there would be no measurable difference in noise levels at the Yarrow Bay red-tailed hawk nest site under the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option. Consequently, the red-tailed hawks would not be affected by changes in highway noise at their nest site. Neither the original 6-Lane Alternative nor this option would remove large trees that provide suitable hawk nest sites.



## How would project construction temporarily affect habitat and associated wildlife species?

As with the original 6-Lane Alternative, construction activities associated with the options could temporarily affect habitat and/or wildlife through:

- Disturbance from noise and associated construction activity
- Temporary vegetation effects from temporary construction facilities (i.e., work bridges and platforms)
- Water quality and quantity effects

The likelihood and anticipated magnitude of these three types of temporary effects are described further below.

### Seattle and Lake Washington

#### How would noise and associated construction activity affect wildlife?

##### ***6 Lanes with Pacific Street Interchange Option***

The 6 Lanes with Pacific Street Interchange option would have the same type of construction activities as the Original 6-Lane Alternative.

Construction in the Seattle project area would occur over approximately 4 to 7 years, depending on the construction staging option for this option. In addition, unique to this option is the construction of the Union Bay Bridge. Noise associated with construction of this bridge could disturb gulls, waterfowl, and other water birds, as well as songbirds that use Marsh Island. For these reasons, overall disturbance to wildlife from construction would be somewhat greater under this option.

##### ***Second Montlake Bridge Option***

The Second Montlake Bridge option generally would have the same type of construction activities as the original 6-Lane Alternative and would occur over approximately the same length of time. However, unique to this option is construction of a second Montlake bridge.

During the construction period, half of the navigational channel that is used by certain wildlife would be blocked for approximately 4 weeks, with additional intermittent blockages. Associated construction noise is expected to disturb gulls, waterfowl, and other birds that use the vicinity of the bridge.



## How would temporary vegetation clearing and shading affect wildlife and habitat?

### **6 Lanes with Pacific Street Interchange Option**

In the Seattle project area, construction of temporary work bridges and platforms under the 6 Lanes with Pacific Street Interchange option would create a shading effect on more vegetation (approximately 1.0 acre more, mostly of shrubs/grasses and wetlands within the Urban Matrix cover type) than the original 6-Lane Alternative (Exhibit 61 from the *Ecosystem Discipline Report* and Exhibit 27 herein). Like the original 6-Lane Alternative, some vegetation would be cleared in these shaded areas.

Exhibit 27. Acres of Temporary Vegetation Removal and Shading by Cover Type in Seattle for 6 Lanes with Pacific Street Interchange Option

Area, Cover Type, and Habitat Type <sup>a</sup>	6 Lanes with Pacific Street Interchange Option
<b>Parks and Other Protected Areas</b>	
Deciduous and/or Coniferous Trees	0.74
Shrub/Grass	0.10
Wetland	0.92
<b>Total</b>	<b>1.76</b>
<b>Open Water<sup>b</sup></b>	
Wetland	<b>1.98</b>
<b>Urban Matrix</b>	
Deciduous and/or Coniferous Trees	0.13
Shrub/Grass	0.62
Wetland	0.41
<b>Total</b>	<b>1.16</b>
<b>Seattle Total</b>	<b>4.90</b>

Note: Affected areas were calculated using GPS data gathered in the field, aerial photography, National Wetland Inventory Maps, and local wetland inventories. Affected areas are based on preliminary design information and are subject to change. No temporary effects on vegetation would occur under the No Build Alternative.

<sup>a</sup>The Lake Washington project area contains only open water habitats that lack wetland vegetation, and therefore effects on vegetation would not occur in these areas.

<sup>b</sup>The Open Water cover type contains wetlands as well as solely open water areas that lack wetland vegetation. Because vegetation removal is not relevant to these nonwetland, open water areas, their acreages are not displayed in this exhibit.

### **Second Montlake Bridge Option**

Temporary construction facilities (i.e., work bridges and platforms) under the Second Montlake Bridge option would be the same as under the original 6-Lane Alternative. The small additional work area necessary for the second Montlake Bridge would have minor effects on vegetation, and consequently temporary vegetation clearing and shading effects on wildlife and habitat would be similar.



## **How would wildlife be affected by temporary effects on water quality and quantity?**

### ***6 Lanes with Pacific Street Interchange Option***

The 6 Lanes with Pacific Street Interchange option would have the same type of temporary effect on water quality and quantity in Seattle and Lake Washington as the original 6-Lane Alternative; however, there is risk of a greater magnitude of effect because the option may include a larger area of construction. As long as BMPs are followed and toxic substances are not spilled or released, no major water quality and quantity effects on wildlife are expected during construction.

### ***Second Montlake Bridge Option***

The Second Montlake Bridge option would have the same type and similar magnitude of effect on water quality in Seattle and Lake Washington as the original 6-Lane Alternative, given the very similar type and duration of construction.

## **How would the project temporarily affect federally listed species and federal species of concern?**

### ***6 Lanes with Pacific Street Interchange Option***

The 6 Lanes with Pacific Street Interchange option would have the same type of construction activities as the original 6-Lane Alternative. In addition, the distances between the nearest pile-driving locations and the Broadmoor eagle nest sites would be very similar to the original 6-Lane Alternative, and anticipated noise levels at the nest sites from pile driving would be virtually identical. However, this option would include more pile driving than the original 6-Lane Alternative due to construction of the Union Bay Bridge. This additional pile driving would increase the possible effect on the nesting success of the Broadmoor eagle pair. Disturbance to foraging peregrine falcons and wintering bald eagles also is expected to be greater under this option compared to the original 6-Lane Alternative.

### ***Second Montlake Bridge Option***

The Second Montlake Bridge option would have the same type of construction activities as the original 6-Lane Alternative and would occur over approximately the same length of time, thus effects on federally-listed species and species of concern are expected to be very similar. However, this option would include construction of a second Montlake Bridge, with associated construction noise that could disturb foraging bald eagles and peregrine falcons and their prey in the vicinity of the bridge.



## **How would the project temporarily affect other state-listed or other state priority species?**

### ***6 Lanes with Pacific Street Interchange Option***

The 6 Lanes with Pacific Street Interchange option would have the same type of construction activities as the original 6-Lane Alternative but could last longer and require more pile driving. In addition, noise associated with construction of the Union Bay Bridge under this option could disturb state-listed and priority wildlife (e.g., western grebe, great blue heron, and hooded merganser) that use the adjacent waters and Marsh Island. For these reasons, overall disturbance to state-listed and priority wildlife would be somewhat greater under this option.

### ***Second Montlake Bridge Option***

Given that the Second Montlake Bridge option would have the same type of construction activities as the original 6-Lane Alternative and would occur over approximately the same length of time, effects on state-listed and priority wildlife are expected to be very similar. However, the option would include construction of a second Montlake Bridge, with associated construction noise that could disturb state-listed and priority birds and other wildlife in the vicinity of the bridge.

## **Eastside**

Location of temporary construction facilities and duration of highway construction in the vicinity of wildlife habitat under the South Kirkland Park-and-Ride Transit Access – 108th Avenue Northeast option would be very similar to the original 6-Lane Alternative in the Eastside project area. Consequently, effects on wildlife from construction noise, temporary vegetation effects, and water quality effects are expected to be very similar.

## **Wildlife and Habitat Mitigation**

### **What has been done to avoid or minimize negative effects on wildlife and wildlife habitat?**

Measures to avoid or minimize effects on wildlife and habitat under the 6-Lane Alternative options would be the same as under the original 6-Lane Alternative and include the following:

- Limiting construction to a relatively small area immediately adjacent to the existing roadway to minimize vegetation clearing.



- Following BMPs and other safety measures to minimize erosion and sedimentation and to minimize the risk of spilling contaminants.
- Replanting temporarily affected areas with native vegetation.
- Planting native shade-tolerant vegetation in areas under the elevated roadway and ramps, where feasible and practical.
- Improving culverts relative to existing conditions to increase the likelihood that terrestrial animals would be able to pass under the highway at creek crossings.
- Minimizing pile driving near the Broadmoor eagle pair nest site during the early part of the bald eagle nesting season, when the birds are most sensitive to disturbance. The bald eagle nesting period is January 1 to August 15. Vibratory pile driving could also be used in appropriate subsurface conditions to reduce noise.
- Avoiding or minimizing effects on the beaver lodge near Foster Island during construction, if possible. Its proximity to the proposed bridge columns and construction piles may preclude its avoidance.

## **How could the project compensate for unavoidable negative effects on wildlife or wildlife habitat?**

As with the original 6-Lane Alternative, each of the 6-Lane Alternative options could result in unavoidable negative effects on the Broadmoor bald eagle pair, primarily through potential effects on the nesting bald eagles from construction noise disturbance. Construction noise may also disturb the eagles while they are foraging. Although no known bald eagle nest trees would be removed, some large trees that could potentially be used as perch or future nest trees may be removed for construction of the proposed project.

Unavoidable negative effects would also occur at wetlands. As discussed in detail in the *Wetlands* section of this addendum, mitigation for wetland effects would be provided in accordance with applicable federal, state, and local requirements. The goal of the wetland mitigation would be to achieve no net loss of wetland functions and values.



# References

- City of Bellevue. 2004. *Custom GIS Data CD/February 2004*.  
<http://www.ci.bellevue.wa.us/page.asp?view=22076>. ArcGIS 8.3.  
Mapping Center, City of Bellevue, Bellevue, Washington.
- City of Seattle. 2003. *Custom GIS Data CD/September 2003*. ArcGIS 8.3.  
Seattle Public Utilities, Seattle, Washington.
- Gersib, R., T. Hilliard, T. Johnson, E. Molash, J. Neugebauer-Rex, K. Lautz, J. Park, A. Perez, K. Prosser, R. Schanz, L. Van Natta, B. Wood. 2004. *Enhancing Transportation Project Delivery through Watershed Characterization I-405/SR-520 Study*.
- Granger, T., T. Hrubby, A. McMillan, D. Peters, J. Rubey, D. Sheldon, S. Stanley, and E. Stockdale. 2005. *Wetlands in Washington State, Volume 2: Guidance for Protecting and Managing Wetlands*. Washington Department of Ecology Publication #05-06-008., Olympia, Washington.
- King County. 1991. *Stream Survey Report Criteria*. King County Department of Development and Environmental Services, Seattle, Washington.
- King County. 2003. *King County GIS Data CD #3: Standard Data/March 2003, and Data CD #4: Parcel Data/March 2003*. ArcGIS 8.3.  
[http://www.metrokc.gov/gis/services/sales\\_main.htm](http://www.metrokc.gov/gis/services/sales_main.htm). King County GIS Center, Seattle, Washington.
- King County and 25 authors. 2001. *WRIA 8 Salmonid Distribution Maps and Database*.
- Mueller, K. W., and D. P. Rothaus. 2001. Habitat associations of introduced smallmouth bass and native signal crayfish of Lake Whatcom, Washington during November 1998. Unpublished report, Washington Department of Fish and Wildlife, LaConner, Washington. 21 p. <http://wdfw.wa.gov/fish/warmwater/library/fpt01-07.pdf>
- Munther, G. L. 1970. Movement and distribution of smallmouth bass in the middle Snake River. *Transactions of the American Fisheries Society* 99:44-53.
- NMFS (National Marine Fisheries Service). 1996. *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale*. National Marine Fisheries Service, Environmental Technical Services Division, Habitat Conservation Branch. 28 pp.
- Parametrix, Inc. 2004. *Ecosystems Discipline Report*. Appendix E to the Draft SR 520 Bridge Replacement and HOV Project Draft Environmental Impact Statement. Prepared for Washington State Department of Transportation, Federal Highway Administration, and Sound Transit. November 11, 2004.



Parametrix, Inc. 2005a. *Water Resources Discipline Report. Appendix T of the SR 520 Bridge Replacement and HOV Project Draft EIS.* Prepared for Washington State Department of Transportation, Federal Highway Administration, and Sound Transit. May 3, 2005.

Parametrix, Inc. 2005b. *Light Intensity Technical Memorandum - Draft.* December 23, 2005.

Peterson, N.P., A. Hendry, and T.P. Quinn. 1992. *Assessment of Cumulative Effects on Salmonid Habitat: Some Suggested Parameters and Target Conditions.* TFW-F3-92-001, WA Timber, Fish and Wildlife.

Pflug, D. E., 1981. *Smallmouth bass (Micropterus dolomieu) of Lake Sammamish: a study of their age and growth, food and feeding habits, population size, movement and homing tendencies, and comparative interactions with largemouth bass.* Thesis, University of Washington, Seattle, Washington. 80 p.

Pisakowski, R. M., and R.A. Tabor. 2000. *Nocturnal habitat use by juvenile Chinook salmon in nearshore areas of southern Lake Washington, a preliminary investigation, 2000.* U.S. Fish and Wildlife Service, Lacey, Washington.

Snohomish County. 2002. *DNR Habitat Condition Criteria and Data Sources.* Snohomish County Surface Water Management, Everett, Washington.

Stein, J. N., 1970. *A study of the largemouth bass population in Lake Washington.* Thesis, University of Washington, Seattle, Washington. 69 p.

StreamNet. 2002. *Salmonid Distribution Map and Data.*  
<http://205.230.28.30:8080/website/snetmapper/viewer.htm>.

Tabor, R. A., M. T. Celedonia, F. Mejia, R. M. Piaskowski, D. L. Low, B. Footen, and L. Park. 2004a. *Predation of juvenile Chinook salmon by predatory fishes in three areas of the Lake Washington basin.* Unpublished report, US Fish and Wildlife Service, Lacey, Washington. 86 p.  
<http://www.fws.gov/pacific/westwafwo/fisheries/Publications/FP24.pd>

Tabor, R. A., J. A. Scheurer, H. A. Gearns, and E. P. Bixler. 2004b. *Nearshore habitat use by juvenile Chinook salmon in lentic systems of the Lake Washington basin.* Annual report, by US Fish and Wildlife Service to Seattle Public Utilities, Seattle, Washington. 58 p.  
<http://www.fws.gov/westwafwo/fisheries/Publications/FP222.pdf>

WDFW. 2003. *Design of Road Culverts for Fish Passage.* Habitat and Lands Program, Environmental Engineering Division. Washington Department of Fish and Wildlife. Olympia, Washington.



University of Washington. 2001. *Final Environmental Impact Statement for the University of Washington Master Plan Seattle Campus*. Volume I. University of Washington, Capital Projects Office. September 10, 2001.

WSDOT. 1993. Implementing Agreement between the WSDOT and the Washington State Department of Ecology Concerning Wetlands Protection and Management. Washington State Department of Transportation.

Washington State Department of Transportation (WSDOT). 2004. Highway Runoff Manual. Publication Number 31-16. March 2004.

WSDOT (Washington State Department of Transportation) and WDFW (Washington State Department of Fish and Wildlife). 2003. *Progress Performance Report for WSDOT Fish Passage Inventory*. Washington State Department of Transportation Fish Passage Barrier Removal Program; Washington State Department of Fish and Wildlife Technical Applications Division. Olympia, Washington.

WSFPB (Washington State Forest Practices Board). 1992. *The Standard Methodology for Conducting Watershed Analysis under Chapter 222-22 WAC, Version 1.00*, Approved August 12, 1992.

Williams, R.W., R.M. Laramie, J.J. Ames. 1975. *A Catalog of Washington Streams and Salmon Utilization. Volume 1: Puget Sound Region*. Washington State Department of Fisheries, Olympia, Washington.

