ECOSYSTEM EVALUATION OF ALTERNATIVES

EASTSIDE RAIL CORRIDOR REGIONAL TRAIL MASTER PLAN PROJECT

FEBRUARY 2016

King County Parks Your Big Backyard King County

The Eastside Rail Corridor Regional Trail Master Plan Project develops a baseline inventory and planning guidelines for portions of the Eastside Rail Corridor owned by King County and Sound Transit.

A variety of uses is possible for the corridor in the future, and various agencies and jurisdictions have ownership interests in the corridor. This document is an internal work product supporting a study for future development of a shared use trail in the corridor.

For more information please visit the King County Parks Eastside Rail Corridor – Regional Trail webpage at: http://www.kingcounty.gov/erc

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ACRONYMS AND ABBREVIATIONS

BMP	best management practice
CFR	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
Ecology	Washington State Department of Ecology
ERC	Eastside Rail Corridor
ESA	Endangered Species Act
GIS	geographic information system
GPS	global positioning system
HGM	hydrogeomorphic
HPA	Hydraulic Project Approval
I-405	Interstate 405
JARPA	Joint Aquatic Resource Permits Application
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NWI	National Wetlands Inventory
NPDES	National Pollutant Discharge Elimination System
OHWM	ordinary high water mark
PHS	Priority Habitats and Species
SEPA	State Environmental Policy Act
Sound Transit	Central Puget Sound Regional Transit Authority
SPCC	spill prevention, control, and countermeasure
SWPPP	stormwater pollution prevention plan
SR	State Route
TESC	temporary erosion and sediment control
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WNHP	Washington Natural Heritage Program
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation

1. INTRODUCTION

An ecosystem is defined by the interaction among plants, animals, microorganisms, and the physical environment in which they live. Ecosystems consist of living organisms, including humans, and the environment they inhabit. Understanding this relationship is basic to the environmental review process and the assessment of potential impacts on ecosystems.

This ecosystem resources evaluation addresses potential impacts on ecosystem components identified along the Eastside Rail Corridor (ERC)—aquatic species and habitat; wetlands; and vegetation, terrestrial wildlife species, and habitat. Two build alternatives considered in the ERC Regional Trail Master Plan (Master Plan hereafter) and a No Action Alternative are the basis for the potential impacts on the ecosystems identified along the corridor. This evaluation relies heavily on the *Ecosystem Resources Inventory* (King County 2015), a planning-level study, which documents ecosystem resources through field reconnaissance, existing natural resource mapping, and the use of existing ecosystem data from other sources. This evaluation is not based on formal wetland delineations, stream ordinary high water mark (OHWM) determinations, or species surveys. It is intended to provide likely impacts on ecological features based on the proposed plan alternatives. Formal wetland delineations and more detailed analysis of impacts will be completed during design-level work that will follow the completion of the Master Plan.

During the design level work that follows the Master Plan, wetlands will be delineated in accordance with methods specified in the latest U.S. Army Corps of Engineers (Corps) Delineation Manual and classified according to the U.S. Fish and Wildlife Service (USFWS) *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Hydrogeomorphic (HGM) classifications will be assigned to wetlands using Corps methods established in *the Hydrogeomorphic Classification for Wetlands* (Brinson 1993) and rated according to local code and the *Washington State Wetland Rating System for Western Washington – 2014 Update* (Hruby 2014) or equivalent accepted methodology at that time. Streams will be identified using the criteria from Washington Administrative Code (WAC) 222-06-031 and Forest Practices Board Manual 13, or equivalent accepted methodology at that time; streams will be characterized using adopted criteria for water-crossing passage; and detailed impacts will be calculated.

This evaluation describes the affected environment, and the expected operational (long-term) impacts and construction impacts on ecosystem resources for each of the plan alternatives. It discusses measures that could be applied to avoid and minimize impacts, and provides an overview of the regulatory context associated with compensatory mitigation for unavoidable impacts. It also summarizes the expected natural resource permits and approvals that may be required for ERC trail development.

1.1 Master Plan Alternatives

The Master Plan is an early look at how the trail will fit into the ERC. In general, the Master Plan identifies a "planning envelope"—typically 30 to 40 feet wide—where the trail will be located within the ERC. The trail will typically be less than 30 feet wide. Identifying a planning corridor wider than the proposed trail allows for future flexibility for the final trail design.

At this early stage of the project the trail has not been designed, but the Master Plan will provide the framework for the future design, including the basic design criteria and a toolbox of strategies for responding to the conditions in the corridor that will shape the final design of the trail.

1.1.1 On-Railbed and Off-Railbed Alternatives

The Master Plan is exploring two build alternative locations for a trail in the ERC. In the On-Railbed Alternative, the trail is located along the existing railbed. In the Off-Railbed Alternative, the trail is located as close as possible to one of the edges of the ERC ownership. Please see Volume 2 of the Eastside Rail Corridor Regional Trail Draft Master Plan and Environmental Impact Statement for the preliminary plans for the build alternatives.

In general, the alternative located on the railbed would be easier to construct and cause less disturbance to the landscape. The alternative located on the edge of the right-of-way would provide the most flexibility to accommodate the other future uses envisioned in the corridor (i.e., transit and utilities); however, it would also be more difficult to construct and disturb more existing vegetation.

1.1.2 No Action Alternative

In the absence of a Master Plan, King County would undertake minimal maintenance in order to manage risk, to maintain the corridor property to maintain its integrity for the potential future restoration of freight service, and to protect the County from liability exposure due to public use. Under a "no action" scenario, King County would continue such efforts through basic property-management measures, such as:

- Inspecting and patrolling the corridor at intervals
- Providing basic property maintenance, including vegetation management and drainage maintenance
- Installing and maintaining handrails and decking on bridges kept open for public use
- Installing signs at intersections and elsewhere as needed to manage risk
- Limiting access to unimproved or dangerous structures
- Grading as needed to avoid hazardous conditions (i.e., filling holes or washouts)
- Preserving the corridor property against encroachment

As the interim trail owner, King County's responsibility to maintain and operate the corridor includes managing all County-controlled property within the corridor. This responsibility includes reviewing and deciding on requests for special use permits (requests from private citizens or entities to use public property for private purposes) and determining fees and conditions for such use.

1.2 Study Area

The study area includes 15.6 miles of the ERC right-of-way owned by King County and 1.1 mile owned by the Central Puget Sound Regional Transit Authority (Sound Transit). The ERC corridor is separated into three segments—the Lakefront Segment; Wilburton Segment; and the Valley Segment, which includes the Main Line and the Spur. Figure 1-1 shows the study area and the location of these three segments. Beginning from the south, the study area includes the jurisdictions of Renton, unincorporated King County, Bellevue, Kirkland, and Woodinville. The project biologists reviewed documented occurrences of fish, wildlife, and plant species listed as threatened or endangered that would be potentially affected by project-related noise and human activity within 0.5 mile of the corridor.

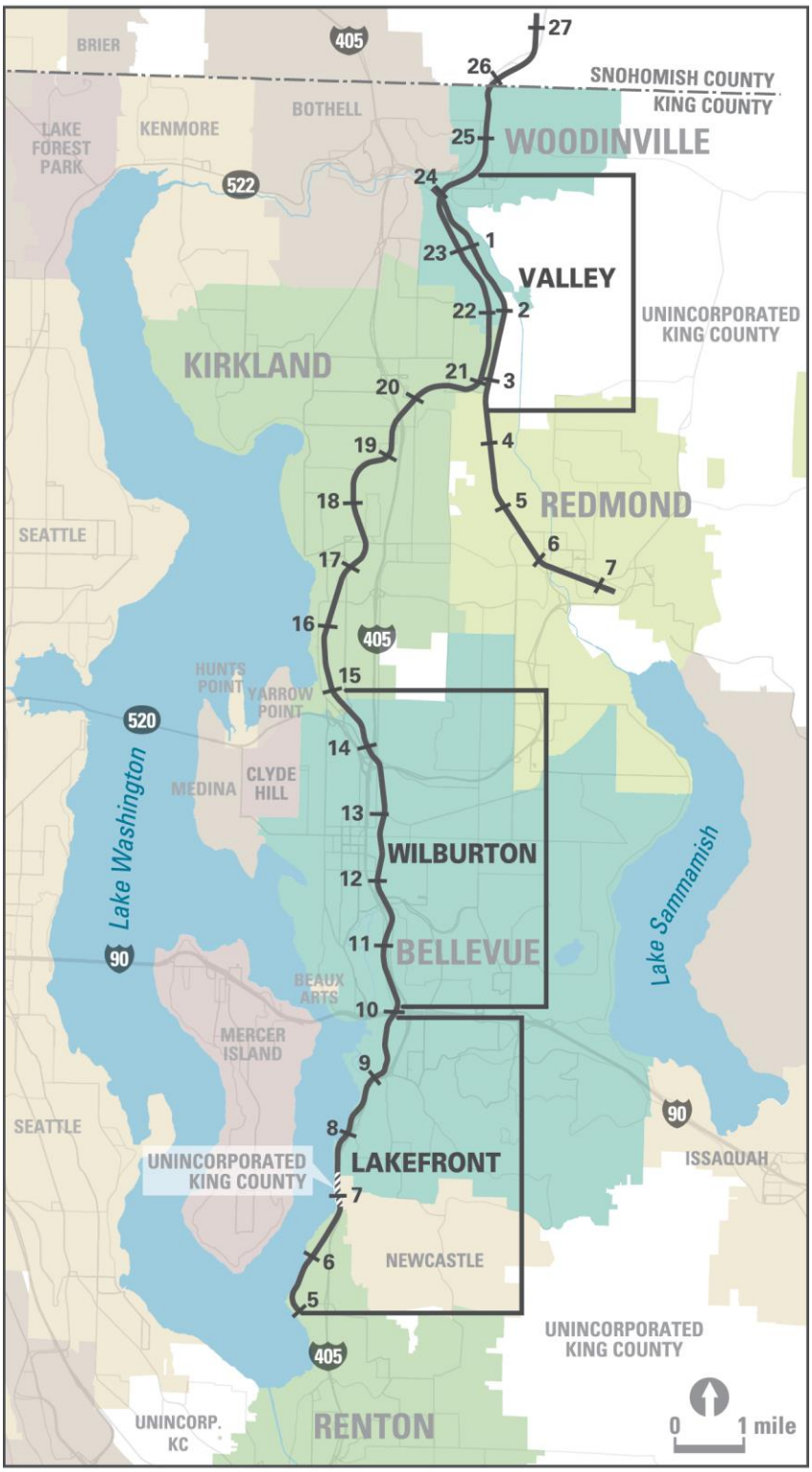

Figure 1-1. ERC Corridor Segments

1.3 Methods

This ecosystem resources analysis relied heavily on the existing *Ecosystem Resources Inventory* (King County 2015). The findings in the inventory included a review of existing information (literature and data sources) and summary of the field reconnaissance. The project biologists reviewed the following literature and data sources:

- 2009 Fish Use of Stream Drainage Basins in the City of Bellevue (City of Bellevue 2009)
- Geographic information systems (GIS) data from the Cities of Bellevue, Renton, and Woodinville, and King County Shoreline Plans for the Cities of Renton, Kirkland, and Woodinville
- King County GIS data
- King County Noxious Weed List for 2015
- King County and City of Renton 2001 Final Adopted May Creek Basin Action Plan
- Washington State Department of Ecology (Ecology) Water Quality Assessment 303(d) list
- Washington Natural Heritage Program (WNHP) List of Natural Heritage Features (Washington State Department of Natural Resources 2015)
- Washington Department of Fish and Wildlife (WDFW) SalmonScape
- WDFW Priority Habitats and Species (PHS) data
- Water Resource Inventory Area (WRIA) 8 Steering Committee and Forum, 2005
- Final Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Chinook Salmon Conservation Plan
- USFWS National Wetlands Inventory (NWI) data

Project biologists documented general habitat, presence of salmonids, barriers to salmonid passage, water quality, and hydrology for streams in the corridor as available from existing reports and data. A review of priority areas for conservation and mitigation within the watershed was conducted based on regional conservation priorities, local basin and shoreline planning, and mitigation policies in accordance with King County and local jurisdictions.

The project biologists also conducted a field inventory from May through September 2014 to identify and inventory wetlands, streams, and jurisdictional ditches by walking the entire study area. Ecosystems observed in the field were identified and mapped at a reconnaissance level using global positioning system (GPS) units and hand-annotating the GIS base map with the applicable data. Observations were based on the King County-owned right-of-way and an area within 100 feet of the right-of-way, where not obscured by vegetation, fencing, or other obstructions. The biologists documented the readily visible characteristics of wetlands and stream systems within the corridor. Observations estimating wetland and stream area, condition, and general vegetative cover were recorded and documented on the GIS base map, data forms, and the field notebook. Mapped wetland areas, streams, and rivers identified in the Ecosystem Resources Inventory are approximate; wetlands were not delineated or rated. Similarly, the OHWM was not identified for all streams and stream types, and ratings have not been determined.

This ecosystem resources evaluation includes a semi-quantitative analysis of impacts on wetlands, streams, and areas of dense tree canopy. The planning area for each build alternative was overlaid onto the GIS base map that shows wetland, stream locations, and areas of dense tree canopy. Impacts were determined as the area of intersection between the proposed planning area and each of these ecosystem resources. In general, impacts from the trail are based on the width of the entire planning area. For example, if the planning area is located over a wetland, the impact is calculated using the

entire 40-foot width of the planning area, which would result in a likely overstatement of impacts in the Master Plan. In the design phase, actual impacts will be calculated based on the proposed trail width and location, including any strategies that may be used to minimize impacts.

Because of the preliminary nature of the planning area and limits of potential impact, this assessment qualitatively describes potential permanent, indirect impacts that may reduce or eliminate wetland functions without directly filling or excavating wetland soils. A qualitative analysis was performed for aquatic species, terrestrial wildlife species, and terrestrial wildlife habitat. Sections 2.1.2, 2.2.2, and 2.2.3 of Chapter 2, Operational Impacts, also briefly describe the methodology applied to the resources considered in this analysis.

1.4 Summary of Findings

This ecosystem resources evaluation of potential impacts along the ERC found that the No Action Alternative in all segments and for all ecosystems considered would not offer physical improvements beyond what is currently being done for the rail corridor; therefore, there would likely be no impact or minimal impacts in the study area for the No Action Alternative. For aquatic species and habitat, of the two build alternatives, the On-Railbed Alternative has the greatest estimated impact on aquatic habitat totaling 4,000 linear feet; the Off-Railbed Alternative has the least potential impacts on aquatic habitat, totaling 2,250 linear feet. Of the 41 streams observed along the ERC, 28 are within both the On-Railbed and Off-Railbed alternative planning areas. Because all work is planned on the trestles that cross over May Creek, Coal Creek, Stream SR6, and Kelsey Creek, minimal impacts are expected to these aquatic habitats.

Of the two build alternatives, the estimated acreage of wetlands that could be affected by the proposed project on the Off-Railbed Alternative is approximately 4.7 acres compared to 4.1 acres of wetland that could potentially be affected by the On-Railbed Alternative. Of the 79 wetlands observed within the ERC, the Off-Railbed Alternative would affect 44 wetlands; the On-Railbed Alternative would affect 58 wetlands. Because all work would occur on the trestle that crosses over Kelsey Creek, it is unlikely work would occur in the stream's adjacent wetlands (WB 25 and WB 26).

Construction of the On-Railbed Alternative on the existing railbed would result in less impacts (10.8 acres) on tree canopy compared to the Off-Railbed Alternative (24.8 acres). Both alternatives are not likely to affect species listed under the Endangered Species Act (ESA), or state-listed threatened or endangered terrestrial wildlife species, or rare plant species identified by the WNHP. The Lakefront Segment alternatives are within 0.5 mile of a state-listed sensitive terrestrial species. Of the higher functioning terrestrial habitats—riparian habitats associated with May Creek, Coal Creek, and Kelsey Creek; Mercer Slough; and Main Line forested slope—the Main Line forested slope (in the Main Line Valley Segment) would experience the greatest impacts on tree canopy. Table 1-1 summarizes the potential operational impacts quantified for the ecosystem resources analyzed in this report.

Table 1-1. SUMMARY OF POTENTIAL BUILD ALTERNATIVE IMPACTS

Resource/Impact Type	On-Railbed Alternative	Off-Railbed Alternative
Streams [a]		
Number of Streams Intersected	28	28
Affected Stream Length [b]	4,000 linear feet	2,250 linear feet
Fish-Bearing Streams Intersected [c]	May Creek, Coal Creek, Kelsey Creek, SW15, SW16, SW17	May Creek, Coal Creek, Kelsey Creek, SW15, SW16, SW17
Wetlands		
Number of Affected Wetlands	58	44
Affected Wetland Area	4.1 acres	4.7 acres
Tree Canopy		
Affected Tree Canopy	10.8 acres	24.8 acres

[a] The planning area assumes the existing trestles over four intersected streams (May Creek, Coal Creek, Kelsey Creek, and SR6) will be used for the proposed trail and will not result in permanent impacts below the OHWM of these streams.

[b] The estimated impacted stream length is rounded up to the nearest 50 linear feet.

[c] Sources: 1) City of Bellevue 2009; 2) WDFW 2014; and 3) WDFW 2015

2. OPERATIONAL IMPACTS

This chapter discusses the potential impacts to the following ecosystems: aquatic species and habitat, wetlands, and vegetation and terrestrial wildlife habitat. Each discussion begins with a description of the affected environment (existing conditions); a brief overview of the methodology; and finally, the potential impacts for the no action and two build alternatives.

2.1 Aquatic Species and Habitat

2.1.1 Affected Environment

Surface water in the study area discharges to the following urban stream basins, all of which are located in WRIA 8 (Lake Washington/Cedar/Sammamish Watershed):

- East Lake Washington (Renton, Bellevue north[1],Bellevue south)
- May Creek
- Coal Creek (Cedar)
- Mercer Slough
- Sammamish River

The streams in the study area are generally affected by the surrounding urban environment. These streams have reaches that are channelized (revetments, levees, ditched) and/or have been piped via corrugated pipes or culverts. The project biologists observed 41 streams in the study area during the field inventory, as shown on the maps that accompany the stream descriptions in the Ecosystem Resources Inventory. Streams occur in all local jurisdictions—8 in Renton, 2 in unincorporated King County, 11 in Bellevue, 8 in Kirkland, and 12 in Woodinville.

Salmonid species have been documented in seven of the study area streams. This information was obtained through review of SalmonScape, WDFW's interactive computer-mapping system (WDFW 2014); PHS on the Web, another WDFW interactive computer-mapping system (WDFW 2015); and the City of Bellevue's fish use descriptions for Coal Creek, Kelsey Creek, Sturtevant Creek, and Yarrow Creek (City of Bellevue 2009) (Table 2-1). Of the salmonid species known or expected to occur in streams in the ERC, the Puget Sound evolutionarily significant unit of Chinook salmon (*Oncorhynchus tshawytscha*), and the Puget Sound evolutionarily significant unit of steelhead trout (*O. mykiss*) are listed as threatened under the ESA. Chinook salmon is also listed as a State Candidate species. Steelhead trout has no listing status at the state level. The Coastal-Puget Sound distinct population segment of bull trout (*Salvelinus confluentus*), listed as threatened under the ESA and categorized as a State Candidate species, has not been documented to be present or modeled as present in streams that intercept the project study area. The closest bodies of water known to contain bull trout include the Sammamish River and Lake Washington.

[1] Yarrow Creek, which is completely piped through the ERC, is the only stream in this basin.

Table 2-1. SALMONID SPECIES POTENTIALLY PRESENT IN THE RAIL CORRIDOR

Stream Name	Local Jurisdiction	Drainage Basin	Potential Salmonid Species in the Rail Corridor[a]
May Creek	Renton	May Creek	Cutthroat trout, sockeye salmon, Chinook salmon, steelhead trout, coho salmon
Coal Creek	Bellevue	Coal Creek (Cedar)	Cutthroat trout, sockeye salmon, Chinook salmon, steelhead trout, coho salmon[b]
Kelsey Creek	Bellevue	Mercer Slough	Cutthroat trout, sockeye salmon, Chinook salmon, steelhead trout, coho salmon
Sturtevant Creek	Bellevue	Mercer Slough	Sockeye salmon[b], Chinook salmon[b], steelhead trout[b], coho salmon[b]
SW15	Kirkland	Sammamish River	Cutthroat trout, sockeye salmon, Chinook salmon[b], steelhead trout, coho salmon[b]
SW16	Kirkland	Sammamish River	Cutthroat trout, sockeye salmon, Chinook salmon[b], steelhead trout, coho salmon[b]
SW17	Kirkland	Sammamish River	Cutthroat trout, sockeye salmon[b], chinook salmon[b], steelhead trout[b], coho salmon[b]

[a] Sources: 1) City of Bellevue 2009; 2) WDFW 2014; and 3) WDFW 2015

[b] Modeled presence only. WDFW defines "modeled presence" as "habitat upstream of known species presence, but downstream of any known natural barrier. The modeled category does not factor habitat quality, flow, or any other natural or human-caused condition that would otherwise prevent habitat use."

As reported in local stream data, other fish species that could be found in the corridor include sculpin (*Cottus* sp.), lamprey (*Lampetra* sp.), and largescale suckers (*Catostomus macrocheilus*) in Coal Creek, and peamouth (*Mylocheilus caurinus*), dace (*Rhyinichthys* sp.), three-spine stickleback (*Gasterosteus aculeatus*), and largescale suckers in Kelsey Creek (City of Bellevue 2009).

2.1.2 Methodology Specific to Aquatic Species and Habitat

The expected impacts on aquatic habitat (streams) are based on GPS coordinates of daylighted segments of streams observed in the field, as well as estimated stream lengths using aerial imagery and existing GIS data (i.e., King County hydrographic data) for the two build alternative alignments. The discussion of fish presence is based on data obtained from SalmonScape, PHS data, and available basin plans.

2.1.3 Impacts

The majority of aquatic habitats (streams) in all segments are generally in poor condition limited by the surrounding urban environment, with reaches that are channelized and/or piped. Table 2-2 describes the estimated linear feet of streams that could be affected by the proposed project for both the On-Railbed and Off-Railbed alternatives.

The No Action Alternative would not offer physical improvements beyond what is currently being done for the rail corridor. As a result, there would likely be no impact or minimal impacts on aquatic species

and habitat in the study area for the No Action Alternative. Of the two build alternatives, the On-Railbed Alternative has the greatest estimated impact on aquatic habitat, totaling 4,000 linear feet; the Off-Railbed Alternative has the least potential impacts on aquatic habitat, totaling 2,250 linear feet. This difference in affected stream length is attributable to three streams that parallel the On-Railbed Alternative to a greater extent than the Off-Railbed Alternative. Stream SR1 in the Lakeside Segment, and Streams SW6 and SW12 in the Valley – Main Line Segment total approximately 1,500 additional linear feet of stream in the On-Railbed planning area.

Of the 41 streams observed along the ERC, 28 are within both the On-Railbed and Off-Railbed alternative planning areas. The Spur section of the Valley Segment is the only instance where both alternatives intersect the same length of stream. Because all work is planned on the trestles that cross over May Creek, Coal Creek, Stream SR6, and Kelsey Creek, minimal impacts are expected to these aquatic habitats.

The discussion that follows examines in greater detail the effects on aquatic species and habitat for each alternative by segment. Chapter 3 describes the proposed mitigation for effects on aquatic species and habitat for all alternatives. Appendix A indicates, in a tabular format, the length of impact for each inventoried stream by segment.

Table 2-2. Operational Impacts on Streams by Segment and Alternative

Segment/Alternative	Number of Streams Intersected	Affected Stream Length (linear feet)[a]	Fish-Bearing Streams Intersected[b]
Lakefront			
On-Railbed Alternative	13	1,700[c]	May Creek, Coal Creek
Off-Railbed Alternative	13	950[c]	May Creek, Coal Creek
Wilburton			
On-Railbed Alternative	1	0 [c]	Kesley Creek
Off-Railbed Alternative	1	0[c]	Kesley Creek
Valley – Main Line			
On-Railbed Alternative	11	2,000	--
Off-Railbed Alternative	11	1,000	--
Valley – Spur			
On-Railbed Alternative	3	300	SW15, SW16, SW17
Off-Railbed Alternative	3	300	SW15, SW16, SW17
Total (All Segments)			
On-Railbed Alternative	28	4,000	May Creek, Coal Creek, Kelsey Creek, SW15, SW16, SW17
Off-Railbed Alternative	28	2,250	May Creek, Coal Creek, Kelsey Creek, SW15, SW16, SW17

[a] The estimated impacted stream length is rounded up to the nearest 50 linear feet.

[b] Sources: 1) City of Bellevue 2009; 2) WDFW 2014; and 3) WDFW 2015

[c] The planning area assumes the existing trestles over four intersected streams (May Creek, Coal Creek, Kelsey Creek, and SR6) will be used for the proposed trail and will not result in permanent impacts below the OHWM of these streams.

2.1.3.1 All Segments

The No Action Alternative would not offer physical improvements beyond what is currently being conducted for the rail corridor. As a result, there would likely be no impact or minimal impacts on aquatic species and habitat in the study area for all segments. Compared to the On-Railbed and Off-Railbed alternatives, the No Action Alternative would not include enhancements to aquatic habitats in the ERC, such as improved fish passage or stream buffer enhancement, which would be included as part of compensatory mitigation for the build alternatives. This concludes the discussion of impacts on aquatic species and habitat for the No Action Alternative.

The two build alternatives have the potential to affect the functions provided by streams including permanent loss or degradation of in-stream or riparian habitat, altered hydrology, or degradation of water quality. Although not quantified in this assessment, the two build alternatives would also affect the functions of vegetated buffers for streams. Stream buffers are important because they reduce the severity of erosion and remove pollutants and sedimentation that would otherwise enter the stream through stormwater runoff. They moderate water level fluctuation in the stream by reducing stormwater runoff, allowing it to percolate into the ground. Vegetated buffers also provide essential habitat for riparian-associated fish and wildlife species. Because of this interrelated relationship between streams and their buffers, reducing or removing stream buffers diminishes the quality of both.

2.1.3.2 Lakefront Segment

In the Lakefront Segment, the On-Railbed Alternative would affect the greatest length of stream (1,700 linear feet) compared to the Off-Railbed Alternative (950 linear feet), but would affect one less stream (13 instead of 14 streams). Stream SR1 constitutes the majority of aquatic habitat impacts on the On-Railbed Alternative (1,450 linear feet) and nearly half the aquatic impacts on the Off-Railbed Alternative (400 linear feet) in this segment. This is due to the stream's parallel position west of the existing railbed.

The affected aquatic habitats do not include May Creek and Coal Creek, and ESA-listed fish-bearing streams with the greatest potential for higher functioning habitat—both alternatives would cross these streams on existing trestles. Although not a higher functioning stream for habitat, both alternatives would avoid Stream SR6 by crossing it on an existing trestle.

2.1.3.3 Wilburton Segment

Although the On-Railbed and Off-Railbed alternatives within the Wilburton Segment would cross streams that are currently piped, these alternatives would not affect any daylighted stream channel located within this segment. All work would occur on the Wilburton Trestle that spans Kelsey Creek—the one stream in the Wilburton Segment with ESA-listed fish and the greatest potential for higher functioning habitat. Both alternatives would avoid all other streams in the segment.

2.1.3.4 Valley Segment

Main Line

Within the Main Line section of the Valley Segment, the On-Rail Alternative would affect the longest length of stream (2,000 linear feet) compared to the Off-Rail Alternative (1,000 linear feet), but would affect one less stream (11 instead of 12 streams). Stream SW12 comprises approximately half of the aquatic habitat impacts for both alternatives (approximately 1000 linear feet for the On-Railbed Alternative and approximately 500 linear feet for the Off-Railbed Alternative). This is due to the stream's parallel position along the slope west of the existing railbed. Stream SW6 is another example of a stream

that parallels the On-Railbed Alternative to a greater extent than the Off-Railbed Alternative, comprising approximately 400 linear feet compared to 200 linear feet, respectively.

All the streams for both alternatives are small, low-functioning aquatic habitats that originate on the hillslope west of the ERC, ultimately flowing to the Sammamish River. None of the streams are of high quality or have documented fish presence.

Spur

Within the Spur section of the Valley Segment, the On-Railbed and Off-Railbed alternatives would affect the same length of stream (300 linear feet) and the same number of streams (three streams). WDFW's SalmonScape data (reviewed November 2014) indicate a "modeled" presence of Chinook salmon and coho salmon for all three streams. The data also show that SW17 has the modeled presence of steelhead trout. SW15 and SW16 have the documented presence of steelhead trout and sockeye salmon. Although fish presence was undocumented in WDFW's SalmonScape and PHS data, and the open channel portion of the stream does not flow through either alternative, it should be noted that biologists observed fish in an unnamed stream, as shown on Map W21 of the Ecosystem Resources Inventory. Water conveyed to this stream is piped through the ERC, and the open channel is immediately downstream of the ERC right-of-way, within proximity to the proposed alignment.

2.2 Wetlands

2.2.1 Affected Environment

The project biologists encountered 79 wetlands during the field inventory, ranging from less than 1 acre to over 7 acres. Wetlands occur in all local jurisdictions—11 in Renton, 3 in unincorporated King County, 26 in Bellevue, 13 in Kirkland, and 26 in Woodinville. The wetlands in the study area are generally narrow and run parallel to the rail corridor in an adjacent ditch—relics of dredging along the railbed and the engineered barrier of the rail prism. Several wetlands are associated with slopes adjacent to the railbed where small drainages or seeps occur, including a long stretch in Kirkland and Woodinville between the vicinity of 139th Avenue NE/Willows Road NE and the vicinity of 128th Place NE. Some of these wetlands extend outside of the right-of-way where the boundary was estimated using aerial imagery and other existing data sources. Many of these wetlands have been filled or modified in some manner and contain non-native or invasive species, but may provide habitat for urbanized wildlife. The Ecosystem Resources Inventory provides greater detail on the wetlands identified in the study area.

2.2.2 Methodology Specific to Wetlands

The potential impacts on wetlands are based on the estimated size of the wetland within the two build alternative alignments.

2.2.3 Impacts

Table 2-3 indicates the estimated acreage of wetlands that could be affected by the ERC project for the On-Railbed and Off-Railbed alternatives. The No Action Alternative would not have physical improvements beyond what is currently being done on the rail corridor. As a result, there would likely be no impact or minimal impacts on wetlands in the study area for the No Action Alternative. Of the two build alternatives, the Off-Railbed Alternative has the greatest estimated interaction with wetlands, totaling 4.7 acres, compared to 4.1 acres of wetland that could potentially be affected by the On-Railbed Alternative. Of the 79 wetlands observed within the ERC, the Off-Railbed Alternative would affect 44

wetlands; the On-Railbed Alternative would affect 58 wetlands. Because all work would occur on the trestle that crosses over Kelsey Creek, it is unlikely the stream's adjacent wetlands (WB 25 and WB 26) would be affected by construction.

The discussion that follows examines in greater detail the effects on wetlands by segment for each alternative. Chapter 3 describes the proposed mitigation for effects on wetlands for all alternatives. Appendix A indicates, in a tabular format, the area of impact for each inventoried wetland by segment.

Table 2-3. Wetland Impacts by Segment and Alternative

Segment/Alternative	Number of Affected Wetlands	Affected Wetland Area (acres)
Lakefront		
On-Railbed Alternative	20	1.9
Off-Railbed Alternative	19	2.1
Wilburton		
On-Railbed Alternative	7	0.7
Off-Railbed Alternative	6	1.9
Valley – Main Line		
On-Railbed Alternative	22	1.0
Off-Railbed Alternative	12	0.3
Valley – Spur		
On-Railbed Alternative	9	0.5
Off-Railbed Alternative	7	0.4
Total (All Segments)		
On-Railbed Alternative	58	4.1
Off-Railbed Alternative	44	4.7

2.2.3.1 All Segments

The No Action Alternative would not offer physical improvements beyond what is currently being conducted for the rail corridor. As a result, there would likely be no impact or minimal impacts on wetlands in the study area for all segments. Compared to the On-Railbed and Off-Railbed alternatives, the No Action Alternative would not include enhancements to degraded wetlands in the ERC, such as wetland restoration or wetland buffer enhancement, which would be included as part of compensatory mitigation for the build alternatives. This concludes the discussion of impacts on wetlands for the No Action Alternative.

Under the two build alternatives, long-term, indirect impacts may occur when permanent wetland impacts result in reducing or eliminating wetland functions of a given wetland, or when alterations to surface water flows separate the wetland from its hydrologic source and prevent it from maintaining wetland hydrology. Loss or reduction of wetland functions may occur when the wetland area is reduced to an extent in which it is unable to provide some or all of its pre-disturbance functions.

Although not quantified in this assessment, the two build alternatives would also affect the functions of wetland vegetated buffers. Wetland vegetated buffers reduce the severity of erosion and remove pollutants and sedimentation that would otherwise enter the wetland through stormwater runoff. They

moderate water level fluctuation in the wetland by reducing stormwater runoff and allowing it to percolate into the ground. Vegetated buffers also provide essential habitat for wetland-associated fish and wildlife species. Because of this interrelated relationship between wetlands and their buffers, reducing or removing wetland buffers diminishes the quality of both.

2.2.3.2 Lakefront Segment

In the Lakefront Segment, the On-Railbed Alternative would affect 20 wetlands, totaling approximately 1.9 acres. The Off-Railbed Alternative would affect 19 wetlands, totaling approximately 2.1 acres. Of the wetlands in this segment, WR1 is the largest estimated wetland that is located entirely within the rail corridor (estimated wetland size is 1 acre). Both build alternatives would affect this wetland; the On-Railbed Alternative would affect 0.7 acre while the Off-Railbed Alternative would affect 0.4 acre. This linear wetland, with an observed community of emergent and shrub species, is situated both west and parallel to the railbed, and hydrologically connected to Stream SR1.

The On-Railbed Alternative would affect approximately 0.1 acre of Wetland WB5, which extends outside the ERC, and is estimated at approximately 4 acres. This wetland comprises forested, shrub, and emergent communities and is part of a larger wetland system that extends into Newcastle Beach Park. The Off-Railbed Alternative avoids affecting this large wetland system.

In the Lakefront Segment, the Off-Railbed Alternative affects slightly more wetland area (2.1 acres compared to 1.9 acre), but affects one less wetland compared to the On-Railbed Alternative.

2.2.3.3 Wilburton Segment

The On-Railbed Alternative in the Wilburton Segment would affect approximately 7 wetlands, totaling 0.7 acre. The Off-Railbed Alternative would affect 6 wetlands, totaling approximately 1.9 acres. Of the wetlands in this segment, WB17, which has a community of both forested and emergent vegetation, is the largest wetland (3.8 acres) that would be affected. Compared to the On-Railbed Alternative, the Off-Railbed Alternative has greater impacts on WB17 (1.5 acres compared to 0.3 acre).

The On-Railbed Alternative would minimally affect (<0.1 acre) of WB23 and WB15. WB23 is another wetland of larger size (1.9 acres) and contains three vegetation communities: forested, shrub, and emergent. WB15, although small in size, is unique in that it is a lake-fringe wetland—it is only one of two lacustrine wetlands in the study area (the other is WR2 on Lake Washington).

In the Wilburton Segment, the Off-Railbed Alternative affects considerably more wetland area (1.9 acres compared to 0.7 acre), but affects one less wetland compared to the On-Railbed Alternative. The majority of impacts for both alternatives are associated with WB17.

2.2.3.4 Valley Segment

Main Line

The On-Railbed Alternative in the Main Line section of the Valley Segment would affect approximately 22 wetlands identified in the Ecosystem Resources Inventory, totaling 1 acre. The Off-Railbed Alternative would affect 12 wetlands identified during the field inventory, and two other unnamed wetlands estimated subsequent to the field inventory, totaling 0.3 acre of wetlands. Many of the wetlands in this corridor intercept hydrologic sources that originate on the hillslope to the west.

The Off-Railbed Alternative would have less impact on wetlands compared to the On-Railbed Alternative (12 wetlands at 0.3 acre compared to 22 wetlands at 1 acre). This is because the majority of the Off-Railbed Alternative is sited east of the existing railbed where there are fewer wetlands. The On-Railbed

Alternative, sited on the existing railbed, extends along a slope, creating a hydrologic barrier. This barrier results in wetlands concentrated on its western perimeter, consequentially causing more impacts on the On-Railbed Alternative.

Spur

The On-Railbed Alternative in the Spur section of the Valley Segment would intersect 9 wetlands, totaling approximately 0.5 acre. The Off-Railbed Alternative would affect 7 wetlands totaling approximately 0.4 acre. With the exception of WW24, the wetlands in this corridor are narrow linear wetlands that extend along the railbed. WW24, estimated at 7.1 acres, contains three vegetation communities: forested, scrub-shrub, and emergent. Both alternatives affect 0.1 acre of WW24.

In the Spur section of this segment, the Off-Railbed Alternative affects slightly less wetland area (0.4 acre compared to 0.5 acre) and affects two less wetlands compared to the On-Railbed Alternative.

2.3 Vegetation and Terrestrial Wildlife Habitat

2.3.1 Affected Environment

2.3.1.1 Vegetation

The urban environment surrounding the ERC includes many residences, commercial buildings, and other structures that have lawns, ornamental plants, shrubs, and scattered trees. An area of land in the Sammamish River Valley near the Kirkland-Woodinville boundary includes some agricultural uses and a nursery.

A large mix of second-growth native forest occurs in the Main Line section of the Valley Segment from Willows Road into Woodinville. Occasional riparian corridor crossings and pockets of natural areas are scattered throughout. Larger riparian corridors intersect the ERC, including May Creek, Coal Creek, and Kelsey Creek. These areas have a greater abundance of forested vegetation compared to the smaller riparian systems that function more as channels (via pipes, culverts, and narrow daylighted channels) for runoff rather than places of habitat. Newcastle Beach Park, located west and directly adjacent to the railbed, and Mercer Slough Nature Park, located to the west of the park, but not directly adjacent, also support sizable areas of native forest.

No rare plant species on the WNHP list were identified in any of the townships, ranges, and sections the ERC intersects. The closest rare plant listings are in T25N, R5E, Section 16 in the vicinity of Bridle Trails State Park, and northeast of the site in T26N, R5E, Sections 1 and 3.Invasive plant species are consistently found throughout the study area, which is indicative of transportation corridors and proximity of human habitation. The presence of invasive vegetation diminishes the value of habitats by competing with native vegetation. Examples of invasive vegetation found within the study area on the King County non-regulated B and C noxious weed list include Canada thistle (*Cirsium arvense*), sow thistle (*Sonchus spp.*), Japanese knotweed (*Polygonum cuspidatum*), poison hemlock (*Conium maculatum*), yellow flag iris (*Iris pseudacorus*), Scotch broom (*Cytisus scoparius*), yellow archangel (*Lamiastrum galeobdolon*), Himalayan blackberry (*Rubus armeniacus*), reed canarygrass (*Phalaris arundinacea*), herb Robert (*Geranium robertianum*), English ivy (*Hedera helix*), and hedge false bindweed (*Calystegia sepium*). The biologists also encountered Policeman's helmet (*Impatiens glandulifera*), purple loosestrife (*Lythrum salicaria*), and tansy ragwort (*Senecio jacobaea*), all of which are on the King County regulated Class B noxious weed list.

2.3.1.2 Terrestrial Wildlife Species and Habitat

No terrestrial ESA-listed species, or state-listed threatened or endangered terrestrial species, is known or expected to occur in the study area. Within 0.5 mile of the ERC, a bald eagle breeding area was identified by the WDFW PHS program in the area between the railbed and I-405, near Exit 9, the Lake Washington Boulevard Newcastle/I-405 interchange (WDFW 2015).

The bald eagle is a state-listed sensitive species. Although not mapped within 0.5 mile of the corridor, several other state-listed sensitive species and candidate species may use habitats in the study area. A state-listed sensitive species that could be in the project corridor includes the peregrine falcon (*Falco peregrinus*). Other candidate species that could be in the project corridor include the Townsend's big-eared bat (*Corynorhinus townsendii*), western toad (*Anaxyrus boreas*), pileated woodpecker (*Dryocopus pileatus*), Vaux's swift (*Chaetura vauxi*), and purple martin (*Progne subis*).

The surrounding urban development of the rail corridor includes residential, office, commercial, light industrial, and community uses, such as parks and hospitals. In the Lakefront Segment, the majority of the ERC runs adjacent to Lake Washington from Gene Coulon Park to Newcastle Beach Park. Much of the land use directly adjacent to the corridor is residential. The Wilburton Segment is bordered primarily by a diverse mix of industrial, residential, and commercial uses. The Main Line section of the Valley Segment is west of several businesses along NE 124th Street between Slater Road and Willows Road in Kirkland, and as it enters Woodinville it skirts the west hillside of the Sammamish River Valley near light industrial, residential, and undeveloped areas. The Spur section of the Valley Segment runs roughly parallel to the mainline along the floor of the Sammamish River Valley through industrial and commercial areas, including open space and agricultural use.

As described above, the ERC falls primarily within commercial, industrial, and residential areas. These areas typically provide habitat only for adaptable species such as sparrows, starlings, doves, rats, mice, raccoons, opossums, and squirrels. However, larger habitat patches do intersect or are in proximity to the ERC that support a larger variety of species, particularly songbirds, raptors, small mammals, coyotes (*Canis latrans*), and black-tailed deer (*Odocoileus hemionus columbianus*). These habitats include the riparian habitats associated with May Creek, Coal Creek, and Kelsey Creek; Mercer Slough, a large wetland complex; and a large swath of forested slope west of the ERC in the Main Line section of the Valley Segment (referred to as Woodinville forested slope). In addition to these larger habitat patches, the ERC and interconnected trails (Tolt Pipeline Trail) provide modest greenspace and connectivity to these higher functioning terrestrial habitats.

May Creek Basin

May Creek Basin is 14 square miles, draining the area north of Cedar River and west of Issaquah Creek and parts of the cities of Renton and Newcastle. Within the basin are numerous tributaries, two lakes (Lake Kathleen and Lake Boren), and wetlands, of which many are situated in the floodplain. May Creek itself originates on the steep forested slopes of Cougar Mountain and Squak Mountain and discharges into Lake Washington. Although much of the basin is affected by human activity, the riparian buffer provides terrestrial habitat, ultimately leading to larger habitat patches. Starting within a mile of Lake Washington, multiple parks and open space managed by multiple jurisdictions (King County, City of Renton, and City of Newcastle) flank the banks and associated tributaries of May Creek. Farther upstream, the riparian corridor extends into even larger habitat patches—Cougar Mountain Regional Wildland Park, Cougar/Squak Corridor, Squak Mountain State Park, Squak Mountain/Tiger Mountain Corridor—and farthest west, West Tiger Mountain Natural Resource Conservation Area. The riparian habitats associated with May Creek and many of its tributaries provide terrestrial wildlife corridors to these habitats of greater value. King County adopted the May Creek Basin Action Plan in 2001 to reduce

flooding, stabilize stream banks, reduce erosion, protect and enhance fish and wildlife habitat, and improve water quality (King County and City of Renton 2001). Implementation of the plan will improve terrestrial habitat within the basin (King County has begun implementing primary recommendations in the plan).

Coal Creek Basin

Coal Creek Basin is approximately 7 square miles. Within the basin are numerous tributaries (largest is Newport Hills Tributary) and wetlands. Coal Creek originates on the steep forested slopes of Cougar Mountain and discharges into Lake Washington. Although much of the basin is affected by human activity, the riparian buffer provides terrestrial habitat, ultimately leading to larger habitat patches. Starting within a mile of Lake Washington, multiple parks and open spaces managed by the City of Bellevue flank the banks and associated tributaries of Coal Creek. These parks and open spaces along the stream are interconnected to the larger habitat patches farther west—Cougar Mountain Regional Wildland Park, Cougar/Squak Corridor, Squak Mountain State Park, Squak Mountain/Tiger Mountain Corridor—and farthest west, West Tiger Mountain NRCA. The riparian habitats associated with Coal Creek and several of its tributaries provide terrestrial wildlife corridors to these habitats of greater value.

Kelsey Creek Basin

Kelsey Creek Basin is approximately 17 square miles with several streams that drain west into the east channel of Lake Washington. The basin includes 19 miles of open stream (10 streams total). The ERC intersects Kelsey Creek and is in proximity to Mercer Slough, both within the Kelsey Creek Basin.

Mercer Slough

Mercer Slough includes Mercer Slough East and Mercer Slough West, Kelsey Creek, Sturtevant Creek, and approximately 320 acres of high value wetlands, including forested/shrub wetlands, emergent wetlands, and freshwater ponds. I-405 prevents the movement of terrestrial habitat into the Kelsey Creek riparian area to the northeast, but allows movement at the southern extent of this large wetland complex.

Kelsey Creek

The ERC crosses Kelsey Creek east of I-405, which acts as a barrier between the Kelsey Creek riparian area and Mercer Slough. Not far upstream from the Wilburton Trestle, Kelsey Creek is joined by Richards Creek and several other tributaries. All these riparian areas are forested at varying degrees of density and are connected to large parks, including Wilburton Hill Park and Kelsey Creek Park, both containing large wetlands. These areas are high in habitat value, but the connectivity between them is diminished by SE 8th Street, Lake Hills Connector, and Richards Road.

Main Line Forested Slope

North of NE 124th Street, the Main Line section of the Valley Segment is bordered by large tracts of forested slope totaling approximately 400 acres. This large, mature, mixed coniferous and deciduous forest is on a slope and almost entirely located on a critical area that is designated erosion and/or landslide hazard area. Many small streams originate in this forested zone, ultimately flowing to the Sammamish River. Although completely surrounded by urban development, the size of the forested area, combined with the ERC and Tolt River Trail, provide both habitat and corridors suitable for the movement of a larger variety of terrestrial species than would normally be present in an urban environment. None of the forested slope is currently functioning as parkland.

At the southern extent of the ERC, this segment is zoned as public/institutional; north of NE 150th Street it is zoned residential (4 units per acre); and north of NE 160th Street it is zoned as public parks and open space (City of Woodinville 2010). The 2012 future land use map designates all uses south of the zoned park area as low density residential. The area zoned as park is designated as public park for future land use (City of Woodinville 2012). Based on zoning and future land use designations, the only portion of the expansive Main Line forested slope with the potential for retention as a greenspace is located north of NE 160th Street.

2.3.2 Methodology Specific to Vegetation, Terrestrial Wildlife, and Habitat

This evaluation quantifies three rare and vulnerable habitats—forests, wetlands, and streams—with an emphasis on those habitats that have the greatest likelihood to support wildlife use. Wetlands in the study area are discussed in the Wetlands section and streams in the study area are discussed in the Aquatic Species and Habitat section. This Vegetation, Terrestrial Wildlife, and Habitat section analyzes potential impacts on terrestrial wildlife, natural heritage features, areas of dense tree canopy, and terrestrial habitats of higher value (specifically riparian areas, large wetland complexes, and large forested tracts).

The project biologists analyzed PHS data to verify the presence of state or federally listed terrestrial wildlife species or habitat within 0.5 mile of the corridor. To ascertain the presence of rare plant species within the corridor, the biologists accessed the list of survey land sections in Washington identified by the WNHP to contain Natural Heritage Features, including rare plant species and biologically sensitive areas.

Using aerial LiDAR and photogrammetry-located vegetation lines (vegetation lines were collected at the drip line), dense tree canopy is quantified within the two build alternative alignments to demonstrate the degree of vegetation impacts. Impacts on habitats of higher value are described qualitatively.

2.3.3 Impacts

Largely situated in an urban environment, the ERC is interspersed with areas of second-growth native forest. Invasive vegetation is common throughout the study area, which is indicative of transportation corridors and proximity to human habitation. Construction of the On-Railbed Alternative on the existing railbed would result in less impacts (10.8 acres) on tree canopy compared to the Off-Railbed Alternative (24.8 acres). Table 2-4 indicates the estimated tree canopy impacts by segment and alternative. Neither alternative is likely to affect ESA-listed species, or state-listed threatened or endangered terrestrial wildlife species, or rare plant species identified by the WNHP. The Lakefront Segment alternatives are within 0.5 mile of a state-listed sensitive terrestrial species. Of the higher functioning terrestrial habitats—riparian habitats associated with May Creek, Coal Creek, and Kelsey Creek; Mercer Slough; and Main Line forested slope—the Main Line forested slope would experience the greatest impacts on tree canopy. The No Action Alternative would not include physical improvements beyond what is currently being conducted on the rail corridor. As a result, there would likely be no impact or minimal impacts on vegetation and terrestrial wildlife and habitat in the study area for the No Action Alternative.

Chapter 3 describes the proposed mitigation for effects on vegetation, terrestrial wildlife, and habitat for all alternatives. The discussion that follows examines in greater detail the effects on these resources by segment for each alternative.

Table 2-4. Affected Tree Canopy by Segment and Alternative

Segment/Alternative	Affected Tree Canopy (acres)
Lakefront	
On-Railbed Alternative	4.9
Off-Railbed Alternative	11.4
Wilburton	
On-Railbed Alternative	2.3
Off-Railbed Alternative	5.2
Valley – Main Line	
On-Railbed Alternative	3.1
Off-Railbed Alternative	7.6
Valley – Spur	
On-Railbed Alternative	0.5
Off-Railbed Alternative	0.6
Total (All Segments)	
On-Railbed Alternative	10.8
Off-Railbed Alternative	24.8

2.3.3.1 All Segments

The No Action Alternative would not offer physical improvements beyond what is currently being conducted for the rail corridor. As a result, there would likely be no impact or minimal impacts on vegetation, terrestrial wildlife, and habitat in the study area for all segments. Compared to the On-Railbed and Off-Railbed alternatives, the No Action Alternative would not include removal of invasive vegetation or revegetation with native plants, which would be included as part of compensatory mitigation for the build alternatives. This concludes the discussion of impacts on vegetation, terrestrial wildlife, and habitat for the No Action Alternative.

Removal of vegetation under the two build alternatives has the potential to disrupt the existing connectivity of aquatic areas (wetlands, streams, and lakes) to uplands and other aquatic areas, which are important for the movement of wildlife from one habitat to another. Habitat connectivity depends greatly on the adjacent land use and amount of development, but in the context of an urban environment, even smaller amounts of fragmentation can have an effect on the movement of terrestrial wildlife. Impacts associated with trail development in both alternatives could also include disturbance associated with increased human access, noise, and light or the additional spread of noxious or invasive plant species.

2.3.3.2 Lakefront Segment

Both the On-Railbed and Off-Railbed alternatives in the Lakefront Segment would extend through the 330-foot buffer of a bald eagle breeding area in the vicinity of the Lake Washington Boulevard SE/I-405 interchange. The bald eagle is a state-listed sensitive species, a federal species of concern, and protected under the Bald Eagle and Golden Eagle Protection Act.

The On-Railbed Alternative would remove approximately 4.9 acres of dense tree canopy. The affected dense tree canopies are largely narrow swaths of vegetation that parallel the existing alignment and adjacent residential development along Lake Washington and roadways to the west. Although not directly adjacent to Mercer Slough, some trees may be removed between the residential homes and the railbed, east of Lake Washington Boulevard and north of Coal Creek Parkway.

The Off-Railbed Alternative would remove approximately 11.4 acres of tree canopy. The affected tree canopies are largely narrow swaths of vegetation that parallel the existing alignment and Lake Washington Boulevard, Seahawks Way, and I-405 to the east. In the vicinity of Mercer Slough, the Off-Railbed Alternative would remove trees between the railbed and the residential area to the east..

In the Lakefront Segment, the Off-Railbed Alternative would remove more tree canopy compared to the On-Railbed Alternative (11.4 acres compared to 4.9 acres). Most tree removal is concentrated in urban areas with connectivity to corridors of higher value diminished by large transportation corridors, such as I-405 and Lake Washington Boulevard. Because work would occur on trestles spanning May Creek and Coal Creek, impacts on these corridors of higher value would be minimized for both alternatives. Compared to the On-Railbed Alternative, the Off-Railbed Alternative would remove slightly more tree canopy in the vicinity of Mercer Slough.

2.3.3.3 Wilburton Segment

The On-Railbed Alternative in the Wilburton Segment would remove approximately 2.3 acres of tree canopy and the Off-Railbed Alternative would remove approximately 5.2 acres. The affected tree canopies are largely narrow swaths of vegetation that parallel the existing alignment in urban sections of Bellevue. Because most work would occur on the existing railbed east of Mercer Slough and would use the existing trestle spanning Kelsey Creek, impacts on these corridors of higher value would be minimized.

2.3.3.4 Valley Segment

Main Line

The On-Railbed Alternative in the Main Line section of the Valley Segment would remove approximately 3.1 acres of tree canopy, and the Off-Railbed Alternative would remove 7.6 acres of tree canopy. The affected forested communities are largely narrow swaths of vegetation that parallel the existing alignment. Because most work would occur on the existing railbed, impacts on the Main Line forested slope, a corridor of higher value, would be minimized.

Removal of trees associated with the Main Line forested slope would be greater under the Off-Railbed Alternative compared to the On-Railbed Alternative. Except for the area north of NE 160th Street (zoned public park and open space), most of the Main Line forested slope is zoned for low-density residential or public/institutional uses. Because these areas would likely be altered by development in the future, effects on the forested slope are minimal and/or in line with tree removal that could occur under current zoning.

Spur

The On-Railbed Alternative in the Spur section of the Valley Segment would remove approximately 0.5 acre of tree canopy, and the Off-Railbed Alternative would remove 0.6 acre of tree canopy. The affected tree canopies are largely narrow swaths of vegetation that parallel the existing alignment. Because most work would occur on the existing railbed for both alternatives, impacts on the adjacent vegetation would be minimized. No corridors of higher value are located in this segment.

3. MITIGATION–ALL ALTERNATIVES

The ERC project would mitigate impacts on ecosystems by proceeding in accordance with the mitigation sequencing requirements established by the State Environmental Policy Act (SEPA), the Clean Water Act (CWA), local critical area ordinances, and other statutes and policies. According to SEPA (WAC 197-11-768), the definition of mitigation is as follows:

a.) Avoiding the impact all together by not taking a certain action or parts of an action.

b.) Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts.

c.) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

d.) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

e.) Compensating for the impact by replacing or providing substitute resources or environments; and/or monitoring the impact and taking appropriate corrective measures.

When permitted projects will create unavoidable impacts on the environment, project sponsors must offset, or "mitigate" the environmental impacts associated with the project. The mitigation process includes avoiding and minimizing impacts as much as possible, and *then* making up for any unavoidable impacts through implementation of a mitigation project (compensatory mitigation). Mitigation projects can occur on site (at or near the place where the impact occurs) or off site, depending on various factors including jurisdictional code, practicality, and meaningful ecological benefit.

3.1 Avoidance and Minimization

BMPs—approved physical, structural, and/or managerial practices that, when used singularly or in combination, prevent or reduce pollutant discharges

Avoidance and minimization of impacts on ecosystems (wetlands and streams) is a guiding principle in the preliminary planning of project alternatives. The process starts with the selection of a preferred alternative. In making this decision, King County will weigh potential impacts on ecosystems against other types of impacts (i.e., geological and transportation), costs, and project objectives. Even focusing on ecosystem impacts, there are very clear trade-offs between the two build alternatives that must be considered. The On Railbed Alternative has greater impacts on wetlands and streams, but requires the removal of far less forested area than the Off Railbed Alternative.

Further avoidance and minimization measures will continue to be considered as the project enters preliminary design, final design, and permitting stages. After the preferred alternative is determined, King County will comply with standard specifications, best management practices (BMPs), and applicable federal, state, and local mitigation requirements during design, construction, and post-construction activities. Significant long-term water quality impacts are not expected if erosion control BMPs, stormwater, and spill containment measures are properly implemented, monitored, and maintained during construction. A temporary erosion and sediment control (TESC) plan may be implemented to minimize and control pollution and erosion from stormwater.

The ERC project could incorporate strategies to avoid and minimize impacts on ecosystems such as:

- Shifting alignments away from critical areas within the 30- to 40-foot planning envelope
- Using retaining walls, boardwalks, or bridges to narrow the trail section where critical areas are adjacent or crossed
- Reducing the width of the trail when adjacent to high-quality critical areas
- Reducing the potential for human and pet intrusion through the use of fencing and signage
- Designing lighting over streams, especially where there might be salmon habitat, to minimize spillover because lighting has been shown to increase predation of juvenile salmon

3.2 Restoration of Construction Impacts

Temporarily disturbed ecosystems would be restored to pre-construction conditions, where feasible, and planted with appropriate native species when construction is completed. The length of time that would be required for site restoration to effectively replace habitat functions would vary.

3.3 Compensatory Mitigation

For any wetland, stream, and buffer impacts that could not be avoided or adequately minimized, King County would replace the area and functions lost through compensatory mitigation. As appropriate, King County would apply the federal Final Compensatory Mitigation Rule (40 Code of Federal Regulations [CFR] Part 230); appropriate currently available agency regulations; guidelines established jointly by Ecology, the U.S. Army Corps of Engineers, and U.S. Environmental Protection Agency in *Wetland Mitigation in Washington State* (Ecology et al. 2006); and local critical areas ordinances for the cities of Renton, Bellevue, Kirkland, and Woodinville, and unincorporated King County. See Appendix B for the range of regulated stream and wetland buffers by jurisdiction.

Mitigation for unavoidable impacts on resources other than wetlands (i.e., streams, stream buffers, and wildlife habitat) would be provided in accordance with the requirements of local critical areas ordinances. In addition, fish passage improvements outlined by WDFW, the Corps, and Ecology will also be identified as part of the mitigation package. In general, those ordinances state that mitigation should prevent the net loss of ecological function; the means of achieving that goal are determined through individual permitting processes. To a large extent, King County's actions to mitigate for impacts on wetlands and wetland buffers (e.g., planting native trees and shrubs near wetland areas) would help offset the loss of some habitat for wildlife and contribute to improved ecological functions of nearby streams and stream buffers.

Long-term impacts on wetlands and buffers could be mitigated by one or more of the following approaches:

- Approved mitigation bank
- In-lieu fee program (King County Mitigation Reserves Program)
- Permittee-responsible mitigation (on site or off site)

In considering these approaches, on-site mitigation is the least practical for King County. Sound Transit and Puget Sound Energy both hold easements within much of the corridor, and on-site mitigation would create encumbrances that could affect the ability of the other owners to act on their interests. Thus, on-site mitigation would likely only be pursued if the other approaches are unavailable or cannot be permitted.

King County would consider opportunities to establish mitigation in advance of the impacts from future construction of the ERC.

Approved Mitigation Bank

Currently, the only approved mitigation bank that has a service area within a portion of the ERC study area is the Springbrook Creek Wetland and Habitat Mitigation bank. The Washington State Department of Transportation (WSDOT) and the City of Renton established this mitigation bank to provide compensatory mitigation in advance of unavoidable impacts on wetlands and other aquatic resources from future projects within two watersheds (Green-Duwamish Watershed [WRIA 9] and the Cedar-Sammamish Watershed [WRIA 8]). WSDOT intends to use this mitigation bank for the I-405 Congestion Relief and Bus Rapid Transit projects, SR 518 improvement projects, and the SR 167 15th SW to 15th NW HOV Stage 3 project. A portion of the credits is set aside for the City of Renton mitigation requirements for other projects within the service area (watersheds). There is the potential that the City of Renton would support using Springbrook Creek Wetland and Habitat Mitigation bank credits in support of the ERC project.

In-Lieu Fee Program (King County Mitigation Reserves Program)

King County has developed an in-lieu fee program called the Mitigation Reserves Program, which was approved by the Corps in March 2012 (King County 2012). The ERC is in the Cedar River/Lake Washington Mitigation Reserve Program service area. The program may be available to project proponents working within incorporated cities if the City codes allow it and the City and County have an agreement in place.

Permittee-Responsible Mitigation (Developed by King County)

Both the *Wetland Mitigation in Washington State* guidance and local codes require that wetland mitigation be completed at specific replacement ratios relative to the category of the wetland affected and the type of mitigation proposed (i.e., wetland creation, restoration, enhancement, or preservation). Appendix C provides wetland mitigation ratios for jurisdictions within the ERC. These replacement ratios are guidelines from which case-by-case consideration start. To determine the appropriate mitigation ratios for this project, the project team may propose adjustments to these guidelines to consider unique project circumstances.

Compensatory mitigation would also be provided for long-term temporary impacts and conversion of wetlands from one type to another (e.g., forested wetland to emergent or scrub-shrub wetland). Generally, compensation for long-term temporary impacts is one-quarter of the typical ratios for long-term (permanent) impacts and one-half for conversion of wetlands. Impacts on buffers would generally be replaced at a minimum ratio of 1:1 using buffer enhancement.

In cooperation with resource agencies, King County would develop plans to mitigate the effects of the project on wetlands and buffers. Site selection would emphasize a watershed approach. To the extent possible, compensatory mitigation sites would be identified and compensate for lost values in-kind. It is environmentally and economically desirable to maximize the ecological functions at sites by consolidating as many mitigation requirements as possible at the least number of mitigation sites. It may be necessary to use several sites and approaches to mitigation given the size of this project, the number of basins it spans, the variety of impacts, complexity of identifying mitigation opportunities, and satisfying mitigation requirements.

Potential project-specific mitigation sites would be selected according to the federal Final Compensatory Mitigation Rule (40 CFR Part 230) and joint guidance developed by Ecology, the Corps, and the U.S. Environmental Protection Agency (Hruby et al. 2009), which discuss the implementation of a watershed

approach to selecting mitigation sites. This approach allows for a greater degree of flexibility in selecting mitigation sites and potentially greater value created for the watershed than the previous regulatory focus on on-site mitigation.

The permittee-responsible mitigation approach to compensate for unavoidable impacts caused by the project may consist of on-site mitigation, off-site mitigation, or a combination of the two. Opportunities for wetland mitigation occur in the study area and outside the study area within the greater project vicinity in the watershed. Although local jurisdictions generally have a preference for on-site mitigation, the local codes generally allow off-site mitigation when it is demonstrated that this will result in a higher likelihood of success and a greater opportunity for ecological lift. The advantage of off-site mitigation is that it offers more flexibility in site selection, has a better chance to provide ecological improvements to the overall watershed, and allows for mitigation to be consolidated to only a few sites. Off-site mitigation would also prioritize sites based on regional conservation priorities and local basin plans.

The right-of-way consists of a long, linear corridor that abuts small portions of several wetlands. On-site mitigation opportunities are constrained by existing roadways, driveways, houses, and other engineered features adjacent to the rail corridor. In addition, a portion of the corridor is being preserved for Sound Transit. These constraints limit the opportunities to increase wetland area at the project site and restrict the potential quality of habitats in any created, restored, or enhanced wetlands in this area. Potential quality is limited by the fragmentation of natural areas due to the level of development along the corridor and the potential for disturbance from anthropogenic activities. If sufficient area could be identified, however, constructing mitigation in the trail corridor would likely result in several small, scattered sites that would provide no significant increase to functions of any single resource.

4. CONSTRUCTION IMPACTS–ALL ALTERNATIVES

Ecosystems could incur long-term or short-term temporary impacts. Long-term temporary impacts on ecosystems occur when functions are affected in such a way that they can be restored, or will eventually be restored over time, but not within a year or so. Short-term temporary impacts last for a limited time, and functions return to pre-impact performance fairly soon (about 1 year or within one growing season of the impact). For example, the duration of construction impacts on emergent wetlands is generally short term while the impact duration on forested and scrub-shrub wetlands is typically long term because of the amount of time it takes for these different types of vegetation to grow. It is assumed that areas temporarily affected during construction (access roads, staging areas, etc.) would be restored to pre-project conditions after construction. Construction impacts would be calculated during subsequent phases of this project, if one of the build alternatives is selected.

Potential construction impacts could include vegetation clearing and temporary site grading and filling for access. Temporary construction impacts on the function of ecosystems could occur within or adjacent to the construction limits for either build alternative. Such impacts would be qualitative in nature and cannot be quantified. Examples of function impacts include soil compaction, accidental spills, noise and anthropogenic disturbance, potential increase of sediment input, and introduction of invasive species.

Temporary impacts on wetlands could consist of minor clearing and grading outside of the trail footprint to enable project construction.

Temporary impacts on channels would occur on streams where regrading is necessary for culvert replacements, extensions, or ditch realignment. Regrading of the channel (upstream and downstream) at culvert replacement areas may be needed to improve stream profile and slope. Temporary stream bypasses or diversions would be used during construction of new culverts.

5. NATURAL RESOURCE PERMITS AND APPROVALS

Permitting projects in Washington State is a complex process involving federal, state, and local agencies with overlapping land use and regulatory authority. For a linear project of this length, the scale of permits and approvals is compounded by the number of local jurisdictional boundaries the ERC intersects. For a successful permitting process, dialogue between the regulating agencies and King County Department of Natural Resources and Parks is integral to a successful permitting process. A project of this scale would benefit from a pre-application process involving the participation of all permitting agencies and continued dialogue as the project moves forward in design. Table 5-1 describes the major permits that may be required, application requirements, typical permit approval schedule, and target dates for application submission.

Table 5-1. Permits and Approvals

Permitting Entity and Permit Requirement	Submittal Requirements	Typical Approval Schedule
FEDERAL		
U.S. Army Corps of Engineers, Seattle District (Corps)		
Clean Water Act (CWA) Section 404 permit (individual or nationwide, applied for via Joint Aquatic Resources Permit Application (JARPA)		
Required to place fill in waters of the United States including wetlands	• Complete the JARPA Form with the following components: ➢ 60% design drawings ➢ Clearing and grading area estimates ➢ Dredge and fill volumes ➢ Construction methods ➢ TESC plan ➢ Dewatering and water quality protection BMPs ➢ Acceptable impact avoidance and minimization measures ➢ Revegetation plan ➢ Mitigation plan ➢ ESA compliance ➢ National Historic Preservation Act Section 106 compliance ➢ Approximate construction schedule (consider fish window for Lake Washington tributaries; the periods when spawning or incubating salmonids are least likely to be present is August 1 to August 31)	~3 to 6 months (Nationwide Permit) (dependent on completion of ESA compliance review) ~1 year (Individual Permit) Note: It is important to understand early on whether the permit can be considered for nationwide versus individual because of the difference in review times.
U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS)		
Endangered Species Act Compliance		
Required prior to issuance of CWA Section 404 permit	• Completed biological evaluation/assessment of effects on ESA-listed species • Submitted with JARPA • Forwarded to NMFS and/or USFWS by the Corps or lead agency with a request for consultation	Up to 4 months, depending on type of consultation

STATE		
Washington Department of Fish and Wildlife		
Hydraulic Project Approval (HPA) (applied for via JARPA)		
HPA permit required prior to construction for work in or near water	• Same as above for CWA Section 404 permit (submittal via JARPA) • Characterization of aquatic habitat impacts • Assessment of mitigation requirements • SEPA compliance • Approximate construction schedule (consider fish window for Lake Washington tributaries; spawning or incubating for salmonids is least likely from August 1 to August 31)	1 to 2 months (dependent on completion of SEPA compliance)
Washington State Department of Ecology		
Clean Water Act Section 401 Water Quality Certification (applied for via JARPA)		
Required prior to construction for in-water projects requiring a CWA Section 404 permit	• Same as above for CWA Section 404 Permit (submittal via JARPA) • Identification of BMPs to avoid and minimize these impacts	3 months (Ecology has up to 180 days for Nationwide Permit, and 1 year for Individual Permit)
National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit		
Required for all soil-disturbing activities (including clearing, grading, excavation) disturbing 1 or more acres and will result in discharge to stormwater or receiving water (wetland, stream, marine water, ditch, estuary)	• Submit Notice of Intent (NOI) – can submit electronically • BMP installation and maintenance • Requires stormwater pollution prevention plan (SWPPP) (or TESC plan, or spill prevention, control, and countermeasure [SPCC] plan) and BMPs • Public notice (at least once a week for 2 consecutive weeks with 7 days in between publication in local newspaper). • 30-day public comment period	2 months (dependent on SEPA compliance)
Local Approvals		
SEPA Approval		
Required for SEPA compliance. Following adoption of the Master Plan and Environmental Impact Statement, phased development may require supplemental checklists to comply with SEPA.	• Completion of SEPA Checklist	3 to 4 months
Critical Areas Land Use Permit		
Required for Critical Areas Ordinance compliance for work (e.g., clearing, grading, building) in critical areas or critical area buffer	• Completed Critical Areas Assessment Report • Mitigation Plan	5 to 6 months
Clearing and Grading Permit		
Required for all clearing and grading work	• Completed Clearing and Grading Permit application • Clearing and grading area • Vegetation removal area • Revegetation plan	3 months
Shoreline Substantial Development Permit		
Required for work within 200 feet of a shoreline of the state or within associated wetlands	• Completed application • Detailed Plans • SEPA must be approved before shoreline permit can be approved	8 to 10 months (dependent on SEPA compliance)

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Appendix A

Aquatic Habitats and Wetlands: Estimated Impacts

Estimated Stream Impacts

Table 1. Lakeside Segment Stream Impacts: On-Railbed Alternative

Stream	Type	Planning Area Type	Segment	Length (lf)
SR1	Stream	On-Railbed	Lakeside	1,445
SR2	Stream	On-Railbed	Lakeside	139
SR3	Stream	On-Railbed	Lakeside	8
SR4	Stream	On-Railbed	Lakeside	8
SR6	Stream	On-Railbed	Lakeside	0
May Creek	Stream	On-Railbed	Lakeside	0
SB6	Stream	On-Railbed	Lakeside	13
SK1	Stream	On-Railbed	Lakeside	29
SK2	Stream	On-Railbed	Lakeside	40
SB1	Stream	On-Railbed	Lakeside	13
SB3	Stream	On-Railbed	Lakeside	15
SB4	Stream	On-Railbed	Lakeside	14
Coal Creek	Stream	On-Railbed	Lakeside	0
Total				**1,723**

Table 2. Lakeside Segment Stream Impacts: Off-Railbed Alternative

Waterway ID	Type	Planning Area Type	Segment	Length (lf)
SR1	Stream	Off-Railbed	Lakeside	377
SR2	Stream	Off-Railbed	Lakeside	139
SR3	Stream	Off-Railbed	Lakeside	5
SR4	Stream	Off-Railbed	Lakeside	34
SR6	Stream	Off-Railbed	Lakeside	0
May Creek	Stream	Off-Railbed	Lakeside	0
SK1	Stream	Off-Railbed	Lakeside	43
SK2	Stream	Off-Railbed	Lakeside	30
SB1	Stream	Off-Railbed	Lakeside	44
SB2	Stream	Off-Railbed	Lakeside	79
SB5	Stream	Off-Railbed	Lakeside	167
SB7	Stream	Off-Railbed	Lakeside	18
Coal Creek	Stream	Off-Railbed	Lakeside	0
Total				**935**

Table 3. Valley – Main Line Segment Stream Impacts: On-Railbed Alternative

Stream	Type	Planning Area Type	Segment	Length (lf)
SKN2	Stream	On-Railbed	Valley – Main Line	3
SKN3	Stream	On-Railbed	Valley – Main Line	1
SKN4	Stream	On-Railbed	Valley – Main Line	15
SW1	Stream	On-Railbed	Valley – Main Line	4
SW2	Stream	On-Railbed	Valley – Main Line	35
SW6	Stream	On-Railbed	Valley – Main Line	411
SW7	Stream	On-Railbed	Valley – Main Line	113
SW9	Stream	On-Railbed	Valley – Main Line	11
SW10	Stream	On-Railbed	Valley – Main Line	238
SW11	Stream	On-Railbed	Valley – Main Line	194
SW12	Stream	On-Railbed	Valley – Main Line	958
Total				**1,984**

Table 4. Valley – Main Line Segment Stream Impacts: Off-Railbed Alternative

Waterway ID	Type	Planning Area Type	Segment	Length (lf)
SKN2	Stream	Off-Railbed	Valley – Main Line	32
SKN4	Stream	Off-Railbed	Valley – Main Line	36
SW1	Stream	Off-Railbed	Valley – Main Line	15
SW2	Stream	Off-Railbed	Valley – Main Line	20
SW3	Stream	Off-Railbed	Valley – Main Line	17
SW6	Stream	Off-Railbed	Valley – Main Line	218
SW7	Stream	Off-Railbed	Valley – Main Line	31
SW8	Stream	Off-Railbed	Valley – Main Line	23
SW9	Stream	Off-Railbed	Valley – Main Line	33
SW11	Stream	Off-Railbed	Valley – Main Line	105
SW12	Stream	Off-Railbed	Valley – Main Line	469
Total				**997**

Table 5. Valley – Spur Segment Stream Impacts: On-Railbed Alternative

Stream	Type	Planning Area Type	Segment	Length (lf)
SW15	Stream	On-Railbed	Valley – Spur	48
SW16	Stream	On-Railbed	Valley – Spur	221
SW17	Stream	On-Railbed	Valley – Spur	8
Total				**277**

Table 6. Valley – Spur Segment Stream Impacts: Off-Railbed Alternative

Waterway ID	Type	Planning Area Type	Segment	Length (lf)
SW15	Stream	Off-Railbed	Valley – Spur	48
SW16	Stream	Off-Railbed	Valley – Spur	214
SW17	Stream	Off-Railbed	Valley – Spur	8
Total				**270**

Estimated Wetland Impacts

Table 7. Lakeside Segment Wetland Impacts: On-Railbed Alternative

Wetland ID	Type	Planning Area Type	Segment	Area (lf)
WR1	Wetland	On-Railbed	Lakeside	30,450.2
WR3	Wetland	On-Railbed	Lakeside	310.6
WR4	Wetland	On-Railbed	Lakeside	425.0
WR5	Wetland	On-Railbed	Lakeside	6,166.4
WR6	Wetland	On-Railbed	Lakeside	0.8
WR10	Wetland	On-Railbed	Lakeside	110.5
WR11	Wetland	On-Railbed	Lakeside	4,603.8
WK1	Wetland	On-Railbed	Lakeside	232.6
WK2	Wetland	On-Railbed	Lakeside	1,438.5
WK3	Wetland	On-Railbed	Lakeside	2,449.1
WB1	Wetland	On-Railbed	Lakeside	4,922.7
WB2	Wetland	On-Railbed	Lakeside	78.2
WB3	Wetland	On-Railbed	Lakeside	1,688.3
WB4	Wetland	On-Railbed	Lakeside	4,234.1
WB5	Wetland	On-Railbed	Lakeside	5,131.7
WB8	Wetland	On-Railbed	Lakeside	7,789.2
WB9	Wetland	On-Railbed	Lakeside	3,166.0
WB10	Wetland	On-Railbed	Lakeside	5,767.5
WB11	Wetland	On-Railbed	Lakeside	2,094.9
WB13	Wetland	On-Railbed	Lakeside	723.1
Total				**81,783.2**

Table 8. Lakeside Segment Wetland Impacts: Off-Railbed Alternative

Wetland ID	Type	Planning Area Type	Segment	Area (sf)
WR1	Wetland	Off-Railbed	Lakeside	17,843.9
WR3	Wetland	Off-Railbed	Lakeside	310.6
WR4	Wetland	Off-Railbed	Lakeside	425.0
WR5	Wetland	Off-Railbed	Lakeside	7,017.9
WR8	Wetland	Off-Railbed	Lakeside	1,090.7
WR11	Wetland	Off-Railbed	Lakeside	4,647.4
WK1	Wetland	Off-Railbed	Lakeside	763.0
WK2	Wetland	Off-Railbed	Lakeside	1,374.0
WK3	Wetland	Off-Railbed	Lakeside	4,001.9
WB1	Wetland	Off-Railbed	Lakeside	13,064.8
WB2	Wetland	Off-Railbed	Lakeside	124.5
WB3	Wetland	Off-Railbed	Lakeside	2,483.5
WB4	Wetland	Off-Railbed	Lakeside	3,905.4
WB6	Wetland	Off-Railbed	Lakeside	2,378.2
WB7	Wetland	Off-Railbed	Lakeside	1,463.5
WB8	Wetland	Off-Railbed	Lakeside	12,542.0
WB10	Wetland	Off-Railbed	Lakeside	14,654.0
WB12	Wetland	Off-Railbed	Lakeside	14,11.4
WB13	Wetland	Off-Railbed	Lakeside	699.7
Total				**90,201.2**

Table 9. Wilburton Segment Wetland Impacts: On-Railbed Alternative

Wetland ID	Type	Planning Area Type	Segment	Area (sf)
WB14	Wetland	On-Railbed	Wilburton	11.5
WB15	Wetland	On-Railbed	Wilburton	<0.1
WB16	Wetland	On-Railbed	Wilburton	5,338.9
WB17	Wetland	On-Railbed	Wilburton	14,879.2
WB19	Wetland	On-Railbed	Wilburton	2,605.8
WB20	Wetland	On-Railbed	Wilburton	5,170.5
WB23	Wetland	On-Railbed	Wilburton	525.8
Total	Wetland			**28,531.7**

Table 10. Wilburton Segment Wetland Impacts: Off-Railbed Alternative

Wetland ID	Type	Planning Area Type	Segment	Area (sf)
WB14	Wetland	Off-Railbed	Wilburton	11.5
WB16	Wetland	Off-Railbed	Wilburton	6,777.1
WB17	Wetland	Off-Railbed	Wilburton	66,147.3
WB19	Wetland	Off-Railbed	Wilburton	2,636.1
WB20	Wetland	Off-Railbed	Wilburton	5,296.7
WB24	Wetland	Off-Railbed	Wilburton	1,124.9
Total				**81,993.7**

Table 11. Valley – Main Line Segment Wetland Impacts: On-Railbed Alternative

Wetland ID	Type	Planning Area Type	Segment	Area (sf)
WKN1	Wetland	On-Railbed	Valley – Main Line	8,696.0
WKN2	Wetland	On-Railbed	Valley – Main Line	2,872.1
WKN4	Wetland	On-Railbed	Valley – Main Line	95.2
WKN5	Wetland	On-Railbed	Valley – Main Line	2,271.5
WKN6	Wetland	On-Railbed	Valley – Main Line	902.5
WKN7	Wetland	On-Railbed	Valley – Main Line	1,080.8
WKN8	Wetland	On-Railbed	Valley – Main Line	53.8
WW1	Wetland	On-Railbed	Valley – Main Line	406.8
WW2	Wetland	On-Railbed	Valley – Main Line	8.8
WW3	Wetland	On-Railbed	Valley – Main Line	1,837.0
WW4	Wetland	On-Railbed	Valley – Main Line	960.9
WW5	Wetland	On-Railbed	Valley – Main Line	650.1
WW6	Wetland	On-Railbed	Valley – Main Line	4,041.0
WW7	Wetland	On-Railbed	Valley – Main Line	573.5
WW8	Wetland	On-Railbed	Valley – Main Line	168.6
WW9	Wetland	On-Railbed	Valley – Main Line	1,164.2
WW10	Wetland	On-Railbed	Valley – Main Line	173.3
WW11	Wetland	On-Railbed	Valley – Main Line	62.9
WW12	Wetland	On-Railbed	Valley – Main Line	4,975.0
WW13	Wetland	On-Railbed	Valley – Main Line	40.2
WW14	Wetland	On-Railbed	Valley – Main Line	12,206.5
WW15	Wetland	On-Railbed	Valley – Main Line	1,372.1
Total				**44,612.7**

Table 12. Valley – Main Line Segment Wetland Impacts: Off-Railbed Alternative

Wetland ID	Type	Planning Area Type	Segment	Area (sf)
Estimated5	Wetland	Off-Railbed	Valley – Main Line	186.3
Estimated6	Wetland	Off-Railbed	Valley – Main Line	580.6
WKN1	Wetland	Off-Railbed	Valley – Main Line	<0.1
WKN2	Wetland	Off-Railbed	Valley – Main Line	72.3
WKN5	Wetland	Off-Railbed	Valley – Main Line	665.9
WKN8	Wetland	Off-Railbed	Valley – Main Line	616.9
WW2	Wetland	Off-Railbed	Valley – Main Line	395.3
WW4	Wetland	Off-Railbed	Valley – Main Line	230.7
WW5	Wetland	Off-Railbed	Valley – Main Line	650.1
WW6	Wetland	Off-Railbed	Valley – Main Line	1,663.5
WW14	Wetland	Off-Railbed	Valley – Main Line	82,16.9
WW15	Wetland	Off-Railbed	Valley – Main Line	1,404.1
Total				**14,682.7**

Table 13. Valley – Spur Segment Wetland Impacts: On-Railbed Alternative

Wetland ID	Type	Planning Area Type	Segment	Area (sf)
WW22	Wetland	On-Railbed	Valley – Spur	24.8
WW23	Wetland	On-Railbed	Valley – Spur	511.5
WW24	Wetland	On-Railbed	Valley – Spur	5,803.3
WW25	Wetland	On-Railbed	Valley – Spur	3,170.5
WW26	Wetland	On-Railbed	Valley – Spur	619.4
WW27	Wetland	On-Railbed	Valley – Spur	37.1
WW29	Wetland	On-Railbed	Valley – Spur	2,999.8
WW31	Wetland	On-Railbed	Valley – Spur	1,030.1
WW34	Wetland	On-Railbed	Valley – Spur	8,028.4
Total				**22,224.9**

Table 14. Valley – Spur Segment Wetland Impacts: Off-Railbed Alternative

Wetland ID	Type	Planning Area Type	Segment	Area (sf)
WW22	Wetland	Off-Railbed	Woodinville Spur	24.8
WW23	Wetland	Off-Railbed	Woodinville Spur	511.5
WW24	Wetland	Off-Railbed	Woodinville Spur	5,803.3
WW27	Wetland	Off-Railbed	Woodinville Spur	1,685.4
WW28	Wetland	Off-Railbed	Woodinville Spur	607.1
WW31	Wetland	Off-Railbed	Woodinville Spur	1,041.8
WW34	Wetland	Off-Railbed	Woodinville Spur	8,028.4
Total				**17,702.3**

Appendix B

Minimum and Maximum Buffer Widths by Jurisdiction – Wetlands and Streams

Minimum and Maximum Buffer Widths by Jurisdiction – Wetlands and Streams

Jurisdiction/Code Citation	Stream	Wetland
Renton Municipal Code (RMC 4.3.050)	Standard buffer: 35 to 100 feeta Reduced buffer: 25 to 75 feet for buffers that are enhanced a	25 -100 feet (wetlands greater than 2,500 square feet)b
Bellevue Municipal Code (BMC 20.25H)c	25-100 feet	40-225 feet (wetlands greater than 2,500 square feet)
King County Code (KCC 21A.24)	25-115 feet	50-275 feet
Kirkland Zoning Code (KZC Chapter 90)	25- 75 feet	25-100 feet
Woodinville Municipal Code (WMC 21.24)	50-150 feet d	Standard: 50-150 feet Reduced buffer: 25-100 feet significantly degraded buffers that are enhanced.

[a] 1) A 200 feet buffer or contiguous floodplain areas or all marshes, bogs, swamps, and river deltas applies to streams that are subject to the provisions of the State Shoreline Management Act; 2) No buffer applies to streams that are non-regulated, non salmonid bearing waters that flow within an artificially constructed channel where no naturally defined channel had previously existed; and/or a surficially isolated water body less than one-half (0.5) acre (e.g., pond) not meeting the criteria for a wetland as defined in subsection M of this Section.

[b] Potential for buffer reduction for Class 1 and 2 wetlands if the wetland complies with RMC 4.3.050 [M6e(i-iii)].

[c] Bellevue Critical Areas Overlay District also include shorelines. Within the rail corridor, Lower Kelsey Creek is considered a Shoreline and is thus subject to a 25-50 feet buffer (BMC 20.25).

[d] Potential for further decreases in buffer widths on streams designated as "urban."

Appendix C

Mitigation Ratios for Jurisdictions within the ERC

Mitigation Ratios for Jurisdictions within the ERC

Recommended Wetland Mitigation Ratios for Projects in Western Washington [a]

Category of Wetland Impacts	Re-establishment or Creation	Rehabilitation Only	Re-establishment or Creation (R/C) and Rehabilitation (RH)	Re-establishment or Creation (R/C) and Enhancement (E)	Enhancement Only
Category II	3:1	6:1	1:1 R/C and 4:1 RH	1:1 R/C and 8:1 E	12:1
Category III	2:1	4:1	1:1 R/C and 2:1 RH	1:1 R/C and 4:1 E	8:1
Category IV	1.5:1	3:1	1:1 R/C and 1:1 RH	1:1 R/C and 2:1 E	6:1

[a] Ecology et al. (2006)

Recommended Wetland Mitigation Ratios for Projects in King County for Permanent Wetland Impacts[a]

Category of Wetland Impacts	Re-establishment or Creation	Rehabilitation Only	1:1 Wetland Re-establishment or Creation (R/C) and Enhancement (E)	Enhancement Only
Category I (Forested)	6:1	12:1	1:1 R/C and 10:1 E	Case-by-case
Category I (Based on score for functions)	4:1	8:1	1:1 R/C and 6:1 E	Case-by-case
Category II	3:1	8:1	1:1 R/C and 2:1 E	12:1
Category III	2:1	4:1	1:1 R/C and 4:1 RH	8:1
Category IV	1.5:1	3:1	1:1 R/C and 2:1E	6:1

[a] King County Code 21A.24.340: Based on those wetland categories and types that are likely to occur in project corridor.

Recommended Wetland Mitigation Ratios for Projects in King County for Temporary Wetland Impacts[a]

Category of Wetland Impacts	Permanent conversion of forested and shrub wetlands into emergent wetlands			Mitigation for temporal loss of forested and shrub wetlands when the impacted wetlands will be revegetated to forest or shrub communities		
	Enhancement	Rehabilitation	Creation or restoration	Enhancement	Rehabilitation	Creation or restoration
Category I	6:1	4.5:1	3:1	3:1	2:1	1.5:1
Category II	3:1	2:1	1.5:1	1.5:1	1:1	.75:1
Category III	2:1	1.5:1	1:1	1:1	.75:1	.5:1
Category IV	1.5:1	1:1	.75:1	Not applicable	Not applicable	Not applicable

City of Renton Wetland Mitigation Ratios[a]

Category of Wetland Impacts	Restoration or Creation	Restoration or Creation (R/C) plus Enhancement (E)
Category I	Forested 6:1	Forested 3:1 R/C and 3.5:1 E
	Scrub Shrub 3:1	Scrub Shrub 1.5:1 R/C and 2:1 E
	Emergent 2:1	Emergent 1:1 R/C and 1.5:1 E
Category II	Forested 3:1	Forested 1.5:1 R/C and 2:1 E
	Scrub Shrub 2:1	Scrub Shrub 1:1 R/C and 1.5:1 E
	Emergent 1.5:1	Emergent 1:1 R/C and 1:1 E
Category III	Forested 1.5:1	Forested 1:1 R/C and 1:1 E
	Scrub Shrub 1.5:1	Scrub Shrub 1:1 R/C and 1:1 E
	Emergent 1.5:1	Emergent 1:1 R/C and 1:1 E

[a] Renton Municipal Code 4.3.050[M11e(i)]

City of Bellevue Wetland Mitigation Ratios[a]

Category of Wetland Impacts	Creation or Restoration[b]
Type I	6:1
Type II	3:1
Type III	2:1
Type IV	1.5:1

[a] Bellevue Land Use Code, Table 20.25H.105(C1)

[b] Bellevue Land Use Code, 20.25H.10(D) allows for mitigation through enhancement. No specific ratios are proposed. Instead, they city requests an "enhancement proposal" that identifies how "enhancement will increase the functions of the degraded wetland and how this increase will adequately mitigate for the loss of wetland area and function at the impact site."

City of Kirkland Wetland Mitigation Ratios[a]

Category of Wetland Impacts	Creation/Restoration	Enhancement
Category I	Primary Basin 3:1 Secondary Basin 3:1	Primary Basin no > 1/3 of the mitigation Secondary Basin no > 1/2 of the mitigation
Category II	Primary Basin 2:1 Secondary Basin 1.5:1	Primary Basin no > 1/3 of the mitigation Secondary Basin no > 1/2 of the mitigation
Category III	Primary Basin 1.5:1 Secondary Basin 1:1	Primary Basin no > 1/3 of the mitigation Secondary Basin no > 1/2 of the mitigation

[a] City of Kirkland Municipal Code 90.55.

City of Woodinville Wetland Mitigation Ratios[a]

Category of Wetland Impacts	Creation or Restoration	Enhancement[b]
Category I	4:1	-
Category II	2:1	-
Category III	1.5:1	-

[a] Lynnwood Municipal Code 17.10.055

[b] Ratios not specified for enhancement