Chapter 4
Environmental Consequences

This section describes the expected temporary construction and permanent operational impacts of the proposed project on the following resources:

- Aquatic resources (Section 4.1)
- Vegetation, wildlife habitat, and wildlife resources, including Washington PHS, threatened and endangered species, and species of concern (Section 4.2)
- Wetland resources (Section 4.3)

4.1 Aquatic Resources

This chapter describes the potential impacts of the construction and operation of the proposed project on aquatic species and habitat. The discussion of project impacts assumes that the BMPs described in Appendix A would avoid and minimize most impacts during construction. Sound Transit considered the following potential impacts on aquatic resources:

- Direct fish mortality
- Permanent loss of in-stream physical habitat
- Permanent degradation of in-stream physical habitat, such as shading, chronic sedimentation, removal of boulders or LWD from the channel, and loss of riparian vegetation function (loss of nutrient inputs, LWD recruitment, and shade)
- Temporary loss of in-stream physical habitat (dewatering)
- Temporary degradation of habitat (e.g., sedimentation, removal of riparian vegetation, disturbance to stream banks)
- Altered hydrology (e.g., higher peak flows causing increased scour/deposition downstream; decreased percolation from impervious surfaces causing lower base flows)
- Temporary or permanent degradation of water quality (e.g., increased temperature, increased turbidity, increased loading of heavy metals and hydrocarbons)
- Increased artificial lighting
- Impacts on fish passage at culverts and new culverts
- Facilitation of urban development
- Beneficial impacts associated with in-stream and riparian restoration, and daylighting existing culverts

Construction of the proposed project could affect aquatic species and habitat near the build alternative sites. This section addresses the potential direct effects of construction and operation activities of each build alternative. Within this context, construction activities typically have short-term effects, which cease or begin to abate, after specific construction activities end. In contrast,

operational activities tend to have long-term or recurring effects. In addition to these potential direct effects, the proposed project can also have indirect effects, which include changes in land use (i.e., increased development or rate of development), that can also affect aquatic species and habitat over the long-term.

This analysis centers on the potential for project impacts on adjacent and downstream aquatic and riparian habitat including potentially affecting treaty protected fisheries resources. This includes direct disturbance or alteration of these habitat features, as well as indirect effects related to project operations. While these impacts can affect a number of aquatic species, there is little or no information regarding the actual presence or conditions of these resources in the project area. Therefore, the primary focus of the assessment is on the impacts that are known to affect the ability of the aquatic environment to support fish, and other aquatic life based on the proximity of their known or expected distribution, or the occurrence of suitable habitat in the project vicinity. In addition, the analyses focus primarily on native fish species and habitat, because of the available information regarding their occurrence in, or potential use, of the water bodies in the study area. They also include most of the threatened, endangered or species of concern that occur in the project area waters, and are economically important in the overall region. The various salmonids are generally addressed as a single group, because the habitat requirements and types of potential impacts are similar, although species-specific impacts are identified where appropriate. Potential effects on other (nonfish) aquatic species (e.g., amphibians) are addressed in the wildlife sections (Section 4.2 Vegetation and Wildlife).

Discussions of long-term and construction-related impacts include assessing the range of impacts that could occur for each build alternative. Actual impacts would depend on final alternative selection and design, construction footprint and methods, BMPs implemented during construction, and performance of post-construction restoration actions, as applicable. This includes revegetation of disturbed areas and mitigation measures required by federal, state, and local regulations, including local Critical Areas Ordinances.

During the Final EIS process, Sound Transit will also review the proposed project to ensure compliance with the ESA and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). However, Sound Transit expects that the proposed project would not have any adverse effects on the species or habitat protected by these acts, based on the known distribution of these species. Section 7(a) (2) of the ESA stipulates that federal agencies must consult with the NMFS and the USFWS to ensure any action authorized, funded, or carried out by a federal agency (in this case, the Federal Transit Administration, which is providing project funding) is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the adverse modification or destruction of designated critical habitat.

Similarly, the Magnuson-Stevens Act requires federal agencies to consult with the NMFS to ensure that their actions minimize, to the extent practicable, adverse effects on essential fish habitat for federally managed fisheries. Essential fish habitat is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” The essential fish habitat potentially affected by the proposed project would be habitat for Chinook and coho salmon.

4.1.1 Temporary Construction-Related Impacts

4.1.1.1 Impacts Common to All Build Alternatives

Construction-related impacts would occur where the project limits cross streams or encroach into stream buffers. Construction impacts would be temporary, and limited to the period during and immediately following project construction. Construction effects at the BNSF Storage Tracks component of the Lynnwood Alternative, BNSF Alternative, and BNSF Modified Alternative sites in Bellevue would be limited to tributary wetlands upstream of the defined channel network of the West Tributary of Kelsey Creek. Construction at the SR 520 Alternative site would directly affect Goff Creek, essentially eliminating the existing surface features and directing the channel into pipes. The Lynnwood Alternative site would directly affect the floodplain of Scriber Creek and its associated wetland (Wetland N1-1), as construction involves clearing and filling the western edge of the floodplain/wetland and the placement of track footings in the floodplain/wetland near where the defined channel of Scriber Creek loses definition and spreads out into the wetland.

Although work within the OHWM would be limited, any construction conducted at the sites has the potential to deliver sediment and contaminants (e.g., fuel and hydraulic fluids) to streams downstream of the proposed project, which could adversely affect aquatic species and habitat conditions, and therefore, could potentially affect treaty-protected fisheries resources. Excessive sediment might preclude downstream salmonid spawning, reduce egg survival, and/or decrease the production and diversity of benthic invertebrates, which provide important food sources of juvenile salmon and resident fish. Increased sedimentation can also reduce the overall quality and quantity of downstream rearing habitat, including habitat supporting juvenile salmonids. Such effects would include direct effects on fish from clogging of gill tissues, behavioral alteration, and/or reduced foraging success. While turbidity typically occurs over a relatively short period of time, the effects of the turbidity on downstream substrate conditions (e.g., sedimentation) can persist for a longer period of time after the source of the turbidity is corrected.

The risk of impact from sedimentation increases during construction because construction activities create exposed soils, subject to erosion and transport to nearby streams (and wetlands). Stormwater discharge during construction would require a National Pollutant Discharge Elimination System (NPDES) permit, issued by Ecology under the federal Clean Water Act (CWA) authorization, to protect water quality conditions. The goal of the permit is to reduce or eliminate stormwater pollution and other impacts on surface waters from construction sites. Temporary erosion and sediment control (TESC) plan BMPs would be implemented and maintained in accordance with a stormwater pollution prevention plan (SWPPP) that would be prepared, as required by the NPDES permit. The TESC plan would include silt fences; protective ground covers such as straw, plastic sheeting, or jute mats; and straw bales in drainage features. Erosion control measures include minimizing areas of grading and vegetation removal, restricting clearing and grading during the rainy season, and requiring immediate revegetation following construction.

The SWPPP would identify BMP plans to control and maintain erosion and soils to avoid or minimize the delivery of construction-related sediment to streams (Appendix A). Where appropriate, the SWPPP would also include a Concrete Containment and Disposal Plan, Dewatering Plan, and a Fugitive Dust Plan. Permits issued by the cities of Bellevue and Lynnwood, and other jurisdictional agencies (e.g., the Corps, Ecology, and WDFW) would also contain detailed conditions of development and requirements for protecting critical areas and habitats. Examples of these

strategies include minimizing vegetation clearing, restoring temporarily affected areas, and preparing and implementing a revegetation plan.

These measures are particularly important when development and clearing activities occur near streams, lakes and wetlands. BMPs would also be implemented to limit soil compaction in sensitive areas, and temporary work bridges could be used in extremely sensitive areas, such as the Scriber Creek wetland (Wetland N1-1).

Although the implementation of erosion control and other stormwater BMPs would minimize or eliminate sediment loading to area streams during construction, some sediment might still be discharged to streams, due to limitations in BMP effectiveness or failure during extreme conditions. Sediment discharges would increase turbidity levels, which can adversely affect fish by disrupting feeding and territorial behavior, increasing stress levels, increasing gill damage, and reducing overall survival.

In addition to the potential effects erosion and sediment loading, the use of heavy construction equipment could increase the potential for leakage of fuel, oil, or hydraulic fluids. A spill prevention, control, and countermeasures plan would also be developed and implemented, as part of the SWPPP, to avoid or minimize construction-related pollutants from entering streams. However, there is still a possibility that some pollutants could be carried by stormwater to area streams. Construction adjacent to or within streams, wetlands, or their buffers would have the highest risk of delivering sediment and pollutants to downstream waters.

For this reason, the total amount of ground disturbance, and the amount of stream or wetland buffer permanently affected, provides an indicator of the risk of potential temporary construction-related impacts (Table 4.1-1).

4.1.1.2 Specific Temporary Construction Impacts of Alternatives

Construction of the proposed project could have temporary construction impacts on aquatic resources. However, the amount of area that would be affected by project construction under the alternatives cannot be determined because construction limits have not been defined in all parts of the study area at the level of design used for the Draft EIS analysis.

The analysis of potential construction impacts did not identify any areas where temporary impacts could extend beyond the study area defined for the analysis of operational impacts. For the ecosystems analysis, all temporary impacts were assumed to occur within the defined project limits and it is assumed that the level of temporary construction impacts would be commensurate with the level of long-term impacts for each build alternative (Table 4.1-1).

The following sections outline the range of potential temporary construction impacts that could occur for each alternative. Actual impacts would depend on the final alternative selection and design, construction footprint and methods, BMPs implemented during construction, and performance of post-construction restoration. Direct construction impacts will be identified and quantified during the Final EIS and permitting phases.

Lynnwood Alternative

Construction activities at the Lynnwood Alternative site are expected to include construction within the adjacent Scriber Creek wetland, which may affect the 100-year floodplain of Scriber Creek, potentially resulting in the temporary loss of riparian habitat due to impacts on wetland vegetation

(Figure 4.1-1a). Temporary work bridges would be used, where appropriate, to minimize effects on the wetland during construction. It is expected that the implementation of appropriate BMPs, as described above and in Appendix A, would prevent temporary impacts on Scriber Creek and associated aquatic resources during construction activities at the Lynnwood Alternative site and that any indirect impacts on the wetland and floodplain would be effectively minimized or mitigated.

Additional discussion of temporary construction impacts on the Scriber Creek wetland is provided in Section 4.3.1.2. Additional discussion of temporary construction impacts on the 100-year floodplain of Scriber Creek is presented in Chapter 3-10, Water Resources, of the Draft EIS.

Design Option C1

The potential effects of Design Option C1 would be the same as those described above for the Lynnwood Alternative site. No temporary construction impacts would occur to the stream channel (Figure 4.1-1a). Therefore, no measurable effects on the aquatic resources are likely to occur.

Design Option C2

The potential effects of Design Option C2 would be similar to those described above for the Lynnwood Alternative site, except that this option would also include the placement of guideway support footings within the Scriber Creek wetland (i.e., Wetland N1-1), which forms a portion of the creek's 100-year floodplain (Figure 4.1-1a), potentially resulting in temporary impacts on the stream's floodplain and the Scriber Creek wetland). Temporary work bridges would be used, where appropriate, to minimize effects on this wetland complex during construction of these footings or support columns. As described above, some of these structures would occur within the 100-year floodplain of Scriber Creek, but would not occur below the OHWM of the stream. Therefore, no measurable direct effects on the aquatic resources are likely to occur.

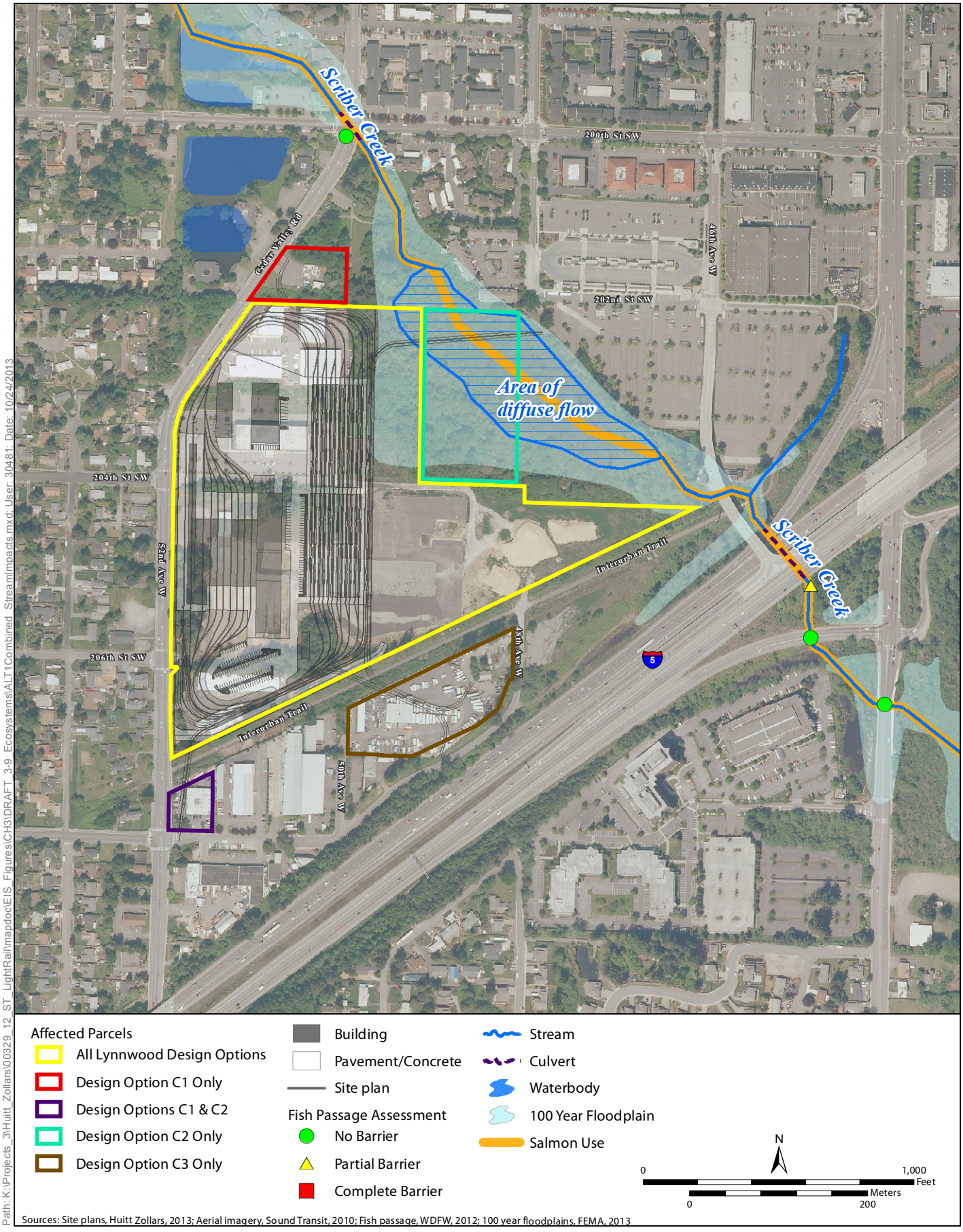

Figure 4.1-1a: Lynnwood Alternative—Streams and Fish Passage Impacts
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Design Option C3

The potential effects of Design Option C3 would be the same as those described above for the Lynnwood Alternative site (Figure 4.1-1a. Therefore, no measurable temporary effects on the aquatic resources are likely to occur.

BNSF Storage Tracks

The BNSF Storage Tracks component of the Lynnwood Alternative would be located in Bellevue along a portion of the BNSF tracks that is also encompassed within the BNSF Alternative and BNSF Modified Alternative sites. The implementation of appropriate BMPs is expected to avoid temporary impacts of construction activities on aquatic resources in the vicinity. No construction activities would occur below the OHWM of any stream under this alternative (Figure 4.1-1b) and no construction impacts would occur on the functional stream buffer or floodplain of the West Tributary of Kelsey Creek as it emanates and flows through Wetland E2-4.

BNSF Alternative

The potential construction effects of this alternative would be similar to those described above in Section 4.1.1.1. The implementation of appropriate BMPs is expected to avoid effects of construction activities on aquatic resources in the vicinity. No construction activities would occur below the OHWM of any stream under this alternative and no disturbance of the functional stream buffer or floodplain of the West Tributary of Kelsey Creek would occur (Figure 4.1-2).

BNSF Modified Alternative

The potential construction effects of this alternative would be similar to those discussed above for the BNSF Alternative. Therefore, no measurable effects on the aquatic resources are likely to occur (Figure 4.1-3).

SR 520 Alternative

The potential construction effects of this alternative would be similar to those described above in Section 4.1.1.1. The implementation of appropriate BMPs is expected to avoid effects of construction activities on downstream aquatic resources.

However, this alternative would include substantial modification of Goff Creek within the project site boundaries (Figure 4.1-4). As described above in Section 3.2.2, this stream segment is currently highly modified and confined within a man-made channel extending throughout the project site, with no natural riparian habitat. This alternative would require relocating this stream channel, or placing it in pipes through the project site (these permanent operational impacts are addressed in Section 4.1.2).

Figure 4.1-1b: Lynnwood Alternative, BNSF Storage Tracks*—Streams and Fish Passage Impacts
Ecosystems Technical Report
*The BNSF Storage Tracks are located in Bellevue

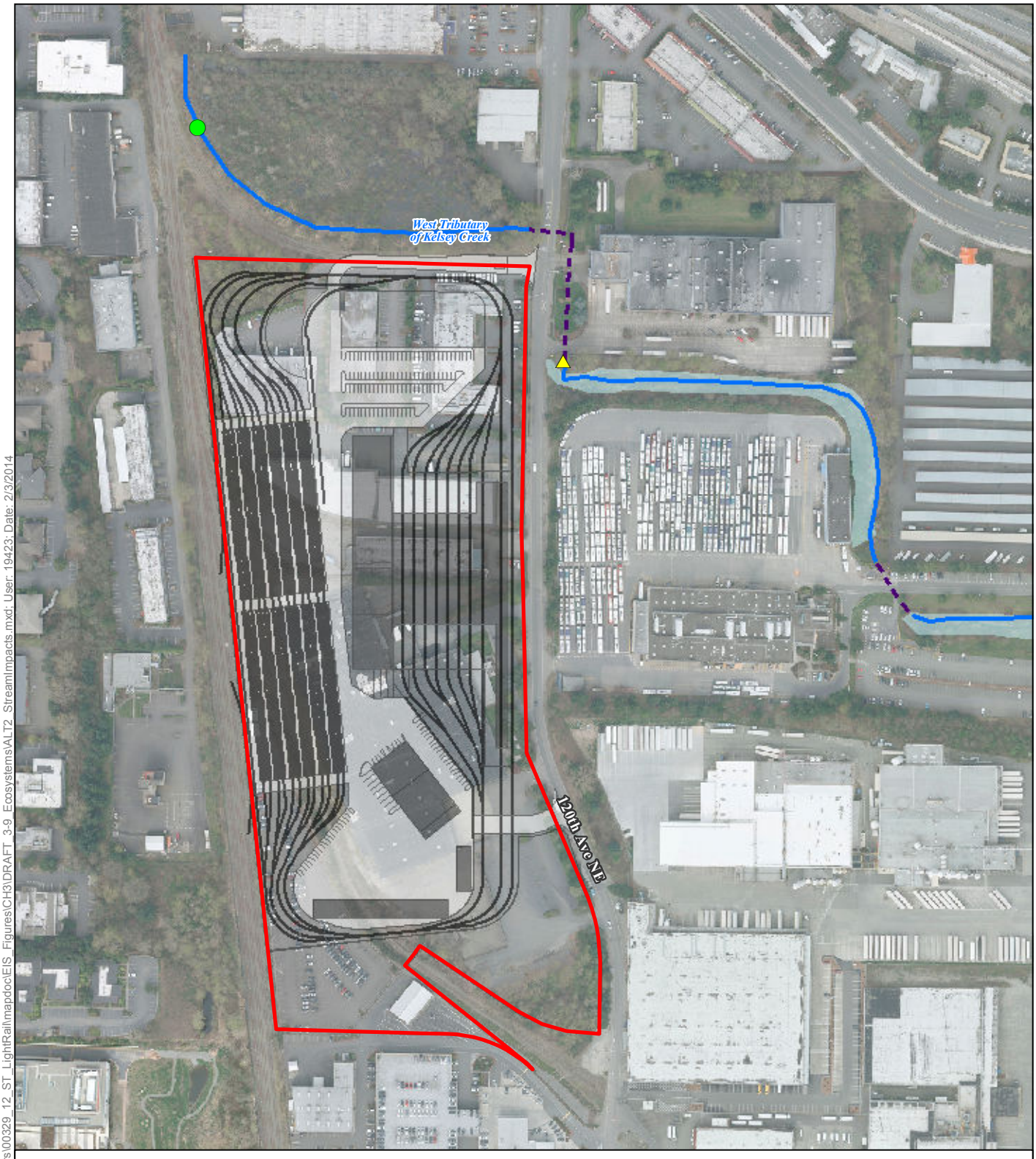

Figure 4.1-2: BNSF Alternative—Streams and Fish Passage Impacts
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Figure 4.1-3: BNSF Modified Alternative—Streams and Fish Passage Impacts
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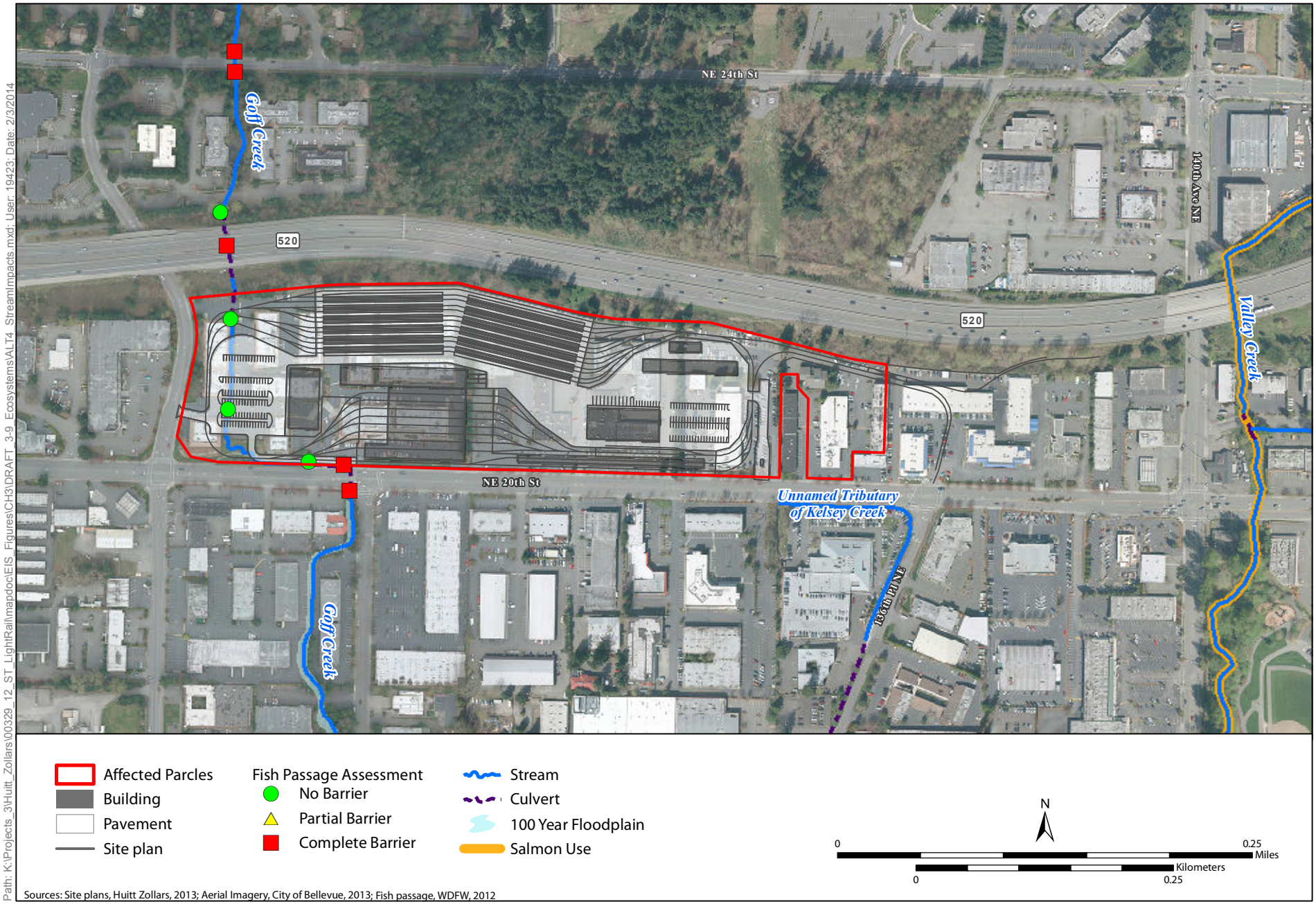

Figure 4.1-4: SR 520 Alternative—Streams and Fish Passage Impacts
Ecosystems Technical Report

Construction activities would be conducted outside of the stream OHWM, until the relocated stream channels or pipes are completed. The streamflows would then be diverted into the new conveyance structures, and the existing channel filled. This process is expected to avoid or substantially minimize potential temporary degradation of downstream water quality conditions during the construction phase.

Before the flow is diverted to the new conveyance structures, and the existing channel dewatered, fish removal activities would be conducted. While these channels are not expected to support extensive fish use, some resident fish are likely to occur, and would need to be removed before stream dewatering or extensive in-water work. These activities would be conducted in compliance with WDFW requirements identified in the project HPA permit.

4.1.2 Permanent Operational Impacts

4.1.2.1 Impacts Common to All Build Alternatives

Permanent impacts could occur where the project limits encroach on stream channels, stream buffers, or stream floodplains, or where the proposed project would pipe a currently open stream channel (e.g., the portion of Goff Creek in the SR 520 Alternative site). The project limits would include the operation and OMSF footprint (including parking), roadway improvements, changes to storm drainage, and other ancillary features. As per the operational impact assumptions (Section 1.4.1.2), nearly all construction is anticipated to occur outside of the OHWM of streams. No impacts on anadromous fish passage are anticipated to currently accessible stream channels because no new culverts, or culvert extensions would be added in stream reaches currently accessible by anadromous fish. Impacts on anadromous fish associated with piping the currently open channel of Goff Creek were considered in light of the potential preclusion of fish use if downstream barriers are removed in the future. The potential for such construction to adversely affect aquatic species or habitats would be avoided or minimized through the implementation of conservation measures necessary for permit compliance.

Permanent impacts on the floodplain and on stream buffer habitat may occur, where elevated guideways are placed in the floodplain or span areas of buffer vegetation, or where fill encroaches on a stream or stream buffer. While fill would generally eliminate vegetation, construction of elevated guideways could also indirectly affect vegetation by reducing the amount of direct precipitation and sunlight reaching the vegetation below the guideways. In particular, guideways with low clearance (i.e., less than about 15 feet) may restrict or eliminate vegetation growth under the structure (Federal Transit Administration 2011). The elevated guideway structures entering and exiting the maintenance facility sites would be relatively narrow, ranging from a maximum of approximately 33 feet wide for the double cross over guideways at the Lynnwood Alternative site [Option C3] to a maximum of approximately 17.75 feet for single track guideways at the BNSF Modified Alternative site. The structures would allow gradual elevation changes between the ground elevation at the OMSF and the height of the elevated mainline guideway. As a result, the effects would vary by structure height, although the overall effects on riparian vegetation would typically be limited.

Based on the nature, location, and condition of the majority of existing stream buffers, the proposed alternatives would not result in significant degradation of existing stream buffer habitat conditions. The Lynnwood Alternative site is an exception, as the development of this site would result in the

loss of wetland vegetation that forms the stream buffer along Scriber Creek and provides beneficial riparian habitat functions to the aquatic system.

The development of each alternative would generally result in an increase in the amount of impervious surface at each site. New impervious surfaces would include maintenance buildings, parking areas, new tracks and guideways, train storage areas and roadways. These new surfaces would replace a mix of existing impervious and pervious surfaces at each site. Impervious surfaces are associated with negative effects on surface waters, including both hydrologic and water quality impacts. Modern stormwater detention and treatment standards are designed to avoid and minimize these impacts on the greatest extent practicable. The Washington Department of Ecology sets the standard for stormwater treatment methods applicable in this region in the 2012 *Stormwater Management Manual for Western Washington* (Washington State Department of Ecology 2012). Sound Transit's *Design Criteria Manual* (Sound Transit 2012) requires that all new facility designs include stormwater detention and treatment infrastructure consistent with or exceeding local and state requirements. Each of the Alternatives would therefore incorporate stormwater detention and treatment consistent with these current standards. These standards include providing stormwater detention consistent with pre-development forested baseline conditions and the best treatment technologies applicable given site-specific conditions (Washington State Department of Ecology 2012).

It is important to note that each alternative site has existing pollution-generating impervious surfaces (PGIS), primarily parking lots and access roads that were developed before modern stormwater management requirements were in place. These sites currently provide little or no stormwater detention and treatment. Therefore, each alternative would replace at least some area of existing untreated PGIS with fully detained and treated PGIS. Moreover, the majority of new impervious surface associated with each alternative would be track yarding. Track yarding is not considered PGIS for the purpose of stormwater treatment. This means that the existing untreated PGIS would be replaced by a smaller amount of fully treated PGIS, and the total amount of stormwater pollutants produced at each site would likely decline relative to existing conditions. The water resources impact analysis is presented in Chapter 3-10, Water Resources, of the Draft EIS.

Given these factors and Sound Transit's commitment to design the proposed project to meet the stormwater management requirements of each jurisdiction, the build alternatives are not expected to have direct adverse effects on water quality. As a result, peak streamflows would not increase because the stormwater systems built for the proposed project would be designed to simulate pre-development hydrology. Additional measures to reduce stormwater runoff, such as low-impact development or other on-site measures, would be considered at a more advanced phase of project development. As a result, stormwater from all project-related impervious surface area would receive appropriate flow control, so that peak streamflows would not be increased. Development of the Lynnwood Alternative site is expected to have indirect adverse effects on water quality because of the loss of 2 acres of stream-associated wetlands that provide beneficial flow retention and vegetative filtering functions for Scriber Creek. These effects are described in more detail below.

To the extent that impacts cannot be avoided or minimized through BMPs, Sound Transit would implement additional measures to reduce adverse effects and provide compensatory mitigation measures where adverse effects are unavoidable. Sound Transit has committed to achieving no net loss of ecosystem function on a project-wide basis. Compensatory mitigation would be conducted in accordance with applicable federal, state, and local requirements and guidelines. These include the federal *Final Compensatory Mitigation Rule* (40 CFR Part 230); interagency guidance prepared by

Ecology, the U.S. Army Corps of Engineers, and U.S. Environmental Protection Agency in *Wetland Mitigation in Washington State* (Washington State Department of Ecology et al. 2006a and 2006b); and local Critical Areas Ordinances.

4.1.2.2 Specific Operational Impacts of Alternatives

The proposed project could have permanent operational impacts on aquatic resources in the project vicinity. These include mostly direct and some potential indirect impacts. The following sections outline the range of potential impacts that could occur for each alternative. Actual impacts would depend on the final alternative selection and design, construction footprint and methods, BMPs implemented during construction, and performance of post-construction restoration.

The potential permanent operational impacts by alternative are summarized in Table 4.1-1 and Figures 4.1-1 through 4.1-4 and described in detail below.

Table 4.1-1. Potential Permanent Operational Impacts on Aquatic Resources

Alternative	Aquatic Resource	Direct Stream Impacts (linear feet)	Stream Buffer Impacts (acres)	Impacts within 100-Year Floodplain (acres)
Lynnwood Alternative				
Design Option C1	Scriber Creek	0	<0.1	<0.1
Design Option C2	Scriber Creek	0	0.1	0.1
Design Option C3	Scriber Creek	0	0	<0.1
BNSF Storage Tracks	West Tributary of Kelsey Creek	0	0	0
BNSF Alternative	West Tributary of Kelsey Creek	0	0	0
BNSF Modified Alternative	West Tributary of Kelsey Creek	0	0	0
SR 520 Alternative	Goff Creek	700	0.64	0

Lynnwood Alternative

Construction of the Lynnwood Alternative would occur within the 100-year floodplain of Scriber Creek and would vary by design option. Permanent impacts would include the placement of approximately 1,000 cubic yards of fill in the Scriber Creek floodplain (under Design Options C1 and C3) or the placement of approximately 1,100 cubic yards of fill in the floodplain under Design Option C2 (due to track footings being placed in the floodplain/Scriber Creek wetland). Impacts associated with the placement of fill in the Scriber Creek floodplain are detailed in Section 3.10, Water Resources, of the Draft EIS.

This alternative is not expected to measurably affect fish species or aquatic habitat conditions in Scriber Creek, or in downstream reaches, because of the limited extent and location of potential effects. No direct impacts on the Scriber Creek stream channel would occur, and any indirect impacts on aquatic resources through impacts on the wetland and floodplain would be effectively minimized or mitigated. The Lynnwood Alternative would directly affect 1.9 to 2.1 acres of the

Scriber Creek wetland (Wetland N1-1), which forms a portion of the 100-year floodplain of Scriber Creek (Table 4.3-2). However, the affected area represents an insignificant portion of the overall Scriber Creek subbasin, and the affected area is effectively isolated from the southeastern portion of the wetland where the stream channel reforms by dense forested and scrub-shrub wetland vegetation.

In addition, the stormwater treatment and flow control measures provided under all the design options, are expected to result in no measurable impacts on flow or water quality conditions in Scriber Creek (Appendix A). Additional discussion of permanent impacts on the 100-year floodplain of Scriber Creek is presented in Section 3.10, Water Resources, of the Draft EIS.

Design Option C1

The potential effects of Design Option C1 would be similar to those described above for the Lynnwood Alternative site. The lead tracks for Design Option C1 follow currently developed routes along the edges of the wetland. This design option would place approximately 1,000 cubic yards of fill into the western edge of the creek's 100-year floodplain, and would thus affect approximately 1.9 acres of the Scriber Creek wetland. The C1 Option is not expected to result in a permanent impact on fish species or aquatic habitat in Scriber Creek because the footprint of this option represents an insignificant portion of the overall subbasin, and no direct impacts on stream channel habitat would occur (Figure 4.1-1a).

Design Option C2

The potential effects of Design Option C2 would be similar to those described above for the Lynnwood Alternative site, but with a slightly higher volume of fill in the 100-year floodplain due to the placement of the track footings and, thus, a slightly larger area of impact on the Scriber Creek wetland. Under Design Option C2, the lead track running east from the site would be constructed near the middle of the wetland and thus near the diffuse flow of Scriber Creek as it passes through the center of the wetland. Design Option C2 would result in 0.2 acre more wetland impact than Design Option C1 or C3 (2.1 acres versus 1.9 acres) because of the configuration of the track extending through the wetland to join track from the Lynnwood Link Extension project (Table 4.3-2 for wetland impacts) (Figure 4.1-1a). No additional effects are expected on fish species or aquatic habitat conditions because the footprint of this option represents an insignificant portion of the overall subbasin, and no direct impacts on the stream channel would occur.

Design Option C3

The potential effects of Design Option C3 would be similar to those described above for the Lynnwood Alternative site and Design Option C1. Design Option C3 is expected to result in less wetland habitat loss than Design Option C2 and the same impacts as Design Option C1 (Table 4.3-2 for wetland impacts) (Figure 4.1-1a). No additional effects are expected on fish species or aquatic habitat conditions because the footprint of this option represents an insignificant portion of the overall subbasin, and no direct impacts on the stream channel would occur.

BNSF Storage Tracks

No streams or stream buffers would be affected by this component of the Lynnwood Alternative. Operation of this alternative would also affect approximately 63 linear feet (less than 0.01 acre) of ditches.

Permanent operational impacts of the BNSF Storage Tracks component of this alternative would include fill of several of the wetlands along the eastern side of the existing BNSF tracks (Eastside Rail Corridor), including along the base of the western slope and the western side of the tracks (Figure 4.1-1b). This would result in the permanent loss of wetlands and wetland buffers (as described below).

It is expected that the implementation of appropriate BMPs would avoid or minimize impacts during construction, such as turbidity, on any portions of the wetlands that are not permanently affected by the project footprint.

BNSF Alternative

The potential effects of this alternative would be similar to those described above, in Section 4.1.2.1-Impacts Common to All Build Alternatives. The permanent effects of this alternative on aquatic habitat would likely be very limited, with no direct stream channel or stream buffer impacts (Figure 4.1-2). Construction of the proposed project at this site would result in a 3% increase in the impervious area of the site from 20.8 acres to 21.4 acres. The proportion of the site characterized as pollution generating impervious surface (PGIS) would decrease by 21% from 11.1 to 8.8 acres due primarily to the conversion of parking lots to track yarding (Section 3.10, Water Resources of the Draft EIS). In addition, retrofitting the stormwater treatment and control measures on the site, to meet current regulations is expected to result in measurable improvements in downstream water quality and streamflow characteristics compared to existing conditions.

BNSF Modified Alternative

The potential construction effects of this alternative on aquatic resources would be similar to those discussed above for the BNSF Alternative. The BNSF Modified Alternative would result in a 12% increase in the impervious area of the site from 23.8 acres to 26.7 acres and the proportion of the site characterized as PGIS would decrease by 9% from 13.6 acres to 12.4 acres due primarily to the conversion of parking lots to track yarding (see Section 3.10, Water Resources of the Draft EIS). No construction activities would occur below the OHWM of any stream or within the stream buffer under this alternative, and retrofitting the stormwater treatment and control measures would improve downstream water quality and streamflow characteristics compared to existing conditions.

SR 520 Alternative

The SR 520 Alternative would alter groundwater, surface water, and stormwater drainage from the site in ways that could have both positive and negative effects on aquatic resources. The SR 520 Alternative would route approximately 700 feet of existing open channel of Goff Creek into piped conveyance systems (Figure 4.1.4), and would eliminate approximately 0.64 acre of stream buffer habitat (0.21 acre of which is also wetland buffer as described below). Grading of the site to allow for a level track yard would eliminate the surface channel and increase the vertical drop where Goff Creek emerges from under SR 520. This would permanently preclude the restoration of fish passage to this portion of Goff Creek, and degrade aquatic habitat functions provided by the affected segment of stream channel. The resulting direct effects on fish and other living aquatic resources would be limited because the portion of Goff Creek within the site is fragmented and separated from productive habitat areas elsewhere in the Goff Creek and Kelsey Creek watersheds and provides poor habitat suitability for aquatic species.

Although this section of stream is highly modified and surrounded by commercial development, it could provide some usable aquatic habitat for resident fish species, such as cutthroat trout, although fish use is expected to be limited due to the generally poor stream and riparian habitat conditions and extensive culverts causing fragmented habitat. However, the existing open channel provides other important stream functions, including contributions to groundwater-fed base flows and water temperatures in downstream reaches, and transporting nutrient and organic material downstream to support the base of the aquatic food chain.

Indirect effects on aquatic habitat function could result from alteration of groundwater hydrology on the site. The existing 700 feet of open channel of Goff Creek, as well as the 226 feet of surface features described as Waters of the U.S. #1and #2 (below), appear to route groundwater from the site into Goff Creek and eventually Kelsey Creek, likely providing beneficial baseflow and water temperature conditions in these habitats. The disruption of groundwater inflow could result in detrimental indirect effects on habitat quality, with the extent and severity dependent on how groundwater from the site is collected and routed to surface waters. Any such adverse effects could be effectively minimized through appropriate design and operation of groundwater drainage systems.

In contrast, the SR 520 Alternative would improve water quality conditions by reducing the amount of pollution-generating impervious surface (PGIS) that drains to surface waters, and by increasing stormwater detention and treatment capacity. The SR 520 Alternative would result in a 33% increase in the impervious area of the site from 18.9 acres to 25.1 acres. The proportion of the site characterized as PGIS would decrease by 18% from 13.3 to 10.9 acres due primarily to the conversion of parking lots to track yarding. The SR 520 Alternative would also improve stormwater detention and treatment site-wide relative to current conditions. The existing site was developed prior to the advent of modern stormwater regulations and a large portion of the existing runoff is untreated. The western portion of the site, approximately 14.9 out of 26.4 total acres, provides some level of stormwater detention and treatment via detention vaults, but the level of treatment is not consistent with current standards. The remaining approximately 11.5 acres has no stormwater detention or treatment, meaning that the existing approximately 6.67 acres of PGIS in this portion of the site drains directly to surface waters. The SR 520 Alternative would retrofit the entire 26-acre site with modern stormwater detention and treatment consistent with current regulatory standards. On this basis, the SR 520 Alternative would likely result in an incremental improvement in water quality conditions in downstream receiving waters relative to current conditions.

Due to extensive downstream channel modifications, the 700 feet of open channel within the project site represents a substantial portion (about 36%) of the total length of open channel habitat currently available between SR 520 and currently accessible anadromous fish habitat in Goff Creek downstream of Bel-Red Road. Although anadromous fish do not currently pass upstream of Bel-Red Road because of blocking culverts, access could be restored in the future by modifying these blockages and restoring stream habitat. The City of Bellevue has plans to daylight large sections of Goff Creek (City of Bellevue 2012a) downstream of the SR 520 Alternative site. While streamflows and water quality conditions are expected to be slightly improved, as a result of meeting stormwater design standards, this alternative would result in a net loss of aquatic habitat in Goff Creek. The open channels contribute to groundwater-fed base flows and water temperatures in downstream reaches, and transport nutrients and organic material downstream to support the aquatic food chain. Overall, the loss of the open channel habitat in the SR 520 Alternative site footprint would be considered a significant impact on aquatic resources in Goff Creek by the Washington Department of Fish and Wildlife, requiring mitigation to offset the loss of habitat function.

Project BMPs are expected to prevent any direct or indirect effects on Valley Creek, which occurs about 150 feet east of the SR 520 Alternative site.

4.2 Vegetation and Wildlife

Sound Transit considered potential impacts on vegetation and wildlife from each build alternative. Impacts include both long-term, operational impacts, and short-term, construction-related impacts. For wildlife, the analysis was based largely on examining the amount and quality of habitat that is currently available for use by wildlife, and comparing it with the amount and quality of habitat that would be available after project construction. Quality of habitat is defined by the amount, distribution, and type of vegetation present; it is also defined by the amount of noise and other human disturbances that occur within or adjacent to the habitat. Other factors, such as wetland hydrology and water quality, can also influence the quality of habitat. For example, certain amphibian species are sensitive to increases in wetland water level fluctuations that may result from development (Richter and Azous 1995).

4.2.1 Temporary Construction-Related Impacts

4.2.1.1 Impacts Common to All Build Alternatives

Noise and Human Disturbance

Both noise and human activity have been demonstrated to displace wildlife from occupied habitats. Noise can interfere with: birds' abilities to hear territorial songs, mating and alarm calls in amphibians and ground squirrels, and mammal and raptor foraging activities (Schaub et al. 2008). There are numerous studies documenting wildlife avoidance of roads and facilities and wildlife disturbance from human activity at varying distances (Madsen 1985, Van der Zande et al. 1980, Fyfe and Olendorff 1976, and Bortolotti et al. 1985).

All of the build alternatives are in urban environments where wildlife have already habituated to a certain level of human noise and activity from highways, residential areas, commercial development, and transit corridors. The degree to which the proposed project may increase or decrease noise and disturbance levels to wildlife is described by alternative in Section 4.2.1.2 Impacts by Alternative.

ESA-Listed Species and State Priority Species and Habitats

No state or federal threatened or endangered wildlife or plant species would be affected by any of the alternatives because they are not present in the area or habitats associated with the alternative sites. Any of the candidate species, species of concern, sensitive species, or monitor species listed in Table 3.3-2 could be affected during construction through small losses of habitat and noise disturbance if these species are present in the study area. The only documented occurrence of a priority species at any of the alternative sites is the pileated woodpecker in association with the Lynnwood Alternative site and the BNSF Storage Tracks component of the alternative in Bellevue. Potential impacts on this species are discussed in Section 4.2.1.2, Specific Temporary Construction Impacts of the Alternatives. Construction noise could temporarily displace pileated woodpeckers transiting over the BNSF Alternative and BNSF Modified Alternative sites to forage in Wetlands E2-3 or E2-4 as described below.

Noxious Weeds

Noxious weeds and exotic plants rapidly colonize disturbed sites such as construction areas. They prevent native species from becoming re-established following ground disturbance, spread into undisturbed areas, and provide poor wildlife habitat or forage. Several of the BMPs that would be implemented during project construction are intended to avoid, reduce, and control new infestations of noxious weeds. These are listed in Appendix A. Given the widespread occurrence of Himalayan blackberry (*Rubus armeniacus*) in the project area under current conditions, all of the Build Alternatives provide opportunity to reduce noxious weeds through vegetation removal and replanting of native species.

4.2.1.2 Specific Temporary Construction Impacts of the Alternatives

Construction of the proposed project could have temporary construction impacts on vegetation and wildlife habitat in the project vicinity. However, the amount of area that would be affected by project construction under the alternatives cannot be determined because construction limits have not been defined in all parts of the study area at the level of design used for the Draft EIS analysis.

The analysis of potential construction impacts did not identify any areas where temporary impacts could extend beyond the study area defined for the analysis of operational impacts. For the ecosystems analysis, all temporary impacts were assumed to occur within the defined project limits and it is assumed that the level of temporary construction impacts would be commensurate with the level of long-term impacts for each build alternative.

The following sections outline the range of potential temporary construction impacts that could occur for each alternative. Actual impacts would depend on the final alternative selection and design, construction footprint and methods, BMPs implemented during construction, and performance of post-construction restoration. Direct construction impacts will be identified during the Final EIS and permitting phases.

Lynnwood Alternative

A certain amount of vegetation would be disturbed or destroyed outside of the project footprint for the purpose of construction. Most of these areas would be re-vegetated with native vegetation following construction. The short-term effect would be displacement or loss of wildlife due to habitat loss. After construction, the replanted areas would provide native vegetation for wildlife, although it would be decades before the habitat would provide mature forested canopy cover. This temporary loss of habitat would have a negative impact on wildlife. A potential benefit to wildlife would be the removal of noxious weeds and replanting with native vegetation.

Project construction would increase noise levels and human activity temporarily, which could cause temporary displacement of some of the species using habitat in the vicinity of the noise, including temporary displacement of pileated woodpeckers foraging on snags in the wetland. These species would be expected to return after construction. Lynnwood Alternative Option C2 would have a greater impact on wildlife than Option C1 or Option C3. Under Option C2, the lead track running east from the site would be constructed near the middle of Wetland N1-1. Lead tracks for Option C1 and Option C3 follow currently developed routes along the edges of the wetland. Thus construction of Option C2 has a greater potential to bring noise and disturbance through the middle of the wetland, affecting interior habitats and temporarily displacing wildlife species to the edges of the wetland or other areas of adjacent habitat.

BNSF Alternative

It is expected that little, if any, vegetation would need to be removed from outside the project footprint for construction purposes. Project construction would increase noise levels and human activity temporarily, which could cause temporary displacement of wildlife using habitat in the vicinity of the noise. This would be most likely to occur related to the forested habitat provided by Wetland E2-4 to the north of the site. Construction noise could temporarily displace pileated woodpeckers transiting over the site to forage in Wetlands E2-3 or E2-4. Wildlife species would be expected to return after construction.

BNSF Modified Alternative

Short-term vegetation disturbance outside the project footprint is expected to be minimal to none. Whatever vegetation is disturbed would be replanted, with an opportunity to increase native vegetation cover and decrease invasive species cover. Project construction would increase noise levels and human activity temporarily, which could cause temporary displacement of wildlife using habitat in the vicinity of the noise. This would be most likely to occur related to the forested habitat provided by Wetland E2-4 to the north of the site. Construction noise could temporarily displace pileated woodpeckers transiting over the site to forage in Wetlands E2-3 or E2-4. Wildlife species would be expected to return after construction.

SR 520 Alternative

Short-term vegetation disturbance outside the project footprint is expected to be minimal to none. Vegetation is disturbed would be replanted, with an opportunity to increase native vegetation cover and decrease invasive species cover. Construction noise would have the least impact of the build alternatives given the current level of noise and development already on site.

4.2.2 Permanent Operational Impacts

4.2.2.1 Impacts Common to All Build Alternatives

Vegetation Removal and Habitat Alteration

Much of the vegetation within the project footprint would be removed and replaced with impervious surfaces. This would increase the proportion of each site that is developed compared with existing conditions (Table 4.2-1). All build alternatives would affect wildlife via direct loss of habitat.

Table 4.2-1. Potential Impacts on Vegetation and Wildlife Habitat

Alternative	Total Area of the Site (acres)	Permanent Operational Impacts						Permanent Change in Developed Extent	
		Acres removed by Vegetation Class					Total Direct Impacts (acres)[a]	Existing Conditions (% of total)	Build Alternatives (% of total)
		UMVC	UMVD	UMVM	UMV	USV			
Lynnwood Alternative									
Design Option C1	38	3	3	<1	3	2	11	17 (45%)	28 (74%)
Design Option C2	42	3	3	<1	3	2	11	16 (38%)	27 (64%)
Design Option C3	40	3	3	<1	3	2	11	19 (48%)	30 (75%)
BNSF Storage Tracks	15	0	<1	<1	<1	<1	<1	12 (80%)	12 (80%)
BNSF Alternative	27	0	1	<1	<1	2	3	22 (81%)	25 (93%)
BNSF Modified Alternative	39	0	4	<1	<1	2	6	30 (77%)	31 (79%)
SR 520 Alternative	26	0	<1	<1	0	2	2	24 (92%)	26 (100%)

[a] Acres of removed vegetation.

Noise and Human Disturbance

All of the build alternatives are in urban environments where wildlife have already habituated to a certain level of noise and activity from highways, residential areas, commercial development, and transit corridors. The degree to which operational impacts may increase or decrease noise levels and disturbance of wildlife is described by build alternative in Section 4.2.2 2 Specific Operational Impacts of Alternatives.

ESA-Listed Species and State Priority Species and Habitats

No state or federal threatened or endangered wildlife or plant species would be affected by any of the alternatives. Any of the candidate species, species of concern, sensitive species, or monitor species listed in Table 3.3-3 could be affected slightly through small losses of habitat if these species are present in the study area. The only documented occurrence of a priority species at any of the alternative sites is that of pileated woodpecker in association with the Lynnwood Alternative site. Impacts on this species are discussed in Section 4.2.2.2, Specific Operational Impacts of the Alternatives. None of the build alternatives in Bellevue would affect snag recruitment or foraging habitat for pileated woodpeckers in Wetlands E2-3 or E2-4. Priority habitats listed in Table 3.3-4 are discussed by alternative in Section 4.2.2.2, Specific Operational Impacts of Alternatives.

Noxious Weeds

Noxious weeds and exotic plants rapidly colonize disturbed sites such as construction areas. They prevent native species from becoming re-established following ground disturbance, spread into undisturbed areas, and provide poor wildlife habitat or forage. Several of the BMPs that would be implemented during project construction are intended to avoid, reduce, and control new infestations of noxious weeds (Appendix A). Given the widespread occurrence of Himalayan blackberry (*Rubus armeniacus*) and other invasive plant species in the project area under current

conditions, all of the Build Alternatives provide opportunity to at least temporarily reduce noxious weeds through vegetation removal.

4.2.2.2 Specific Operational Impacts of the Alternatives

Construction of the proposed project would have permanent operational impacts on vegetation and wildlife habitat in the project vicinity. These include mostly direct and some potential indirect impacts. The following sections outline the range of potential impacts that could occur for each alternative. Actual impacts would depend on the final alternative selection and design, construction footprint and methods, BMPs implemented during construction, and performance of post-construction wetland and buffer restoration.

The potential permanent operational impacts by alternative are summarized in Table 4.2-1 and Figures 4.2-1 through 4.2-4 and described in detail below.

Lynnwood Alternative

Approximately 6 acres of deciduous and coniferous forested habitat (i.e., UMVD and UMVC) would be permanently removed from the Lynnwood component of the Lynnwood Alternative under each of the three design options (i.e., C1, C2, and C3), increasing the proportion of the site that is developed from 38 to 48% developed under existing conditions to 64 to 75% developed, depending on the design option. Approximately 1.6 to 1.8 acres (depending on the design option) of this habitat is forested wetland (Figure 4.2-1a). Wetland N1-1 is part of the Swamp Creek wetland complex identified by WDFW as a priority habitat. While no priority species sightings are known at this site, pileated woodpeckers have foraged in snags in the wetland and are likely to occur there. Other priority species, such as bats or purple martins could use the area for foraging or even breeding. Impacts would include a decrease in forest and wetland habitat patch size, a possible decrease in snags, and decreased snag-recruitment potential. Loss of snags could affect the foraging suitability of Wetland N1-1 for pileated woodpeckers. If there are changes in hydrology that occur as a result of the 1.6 to 1.8 acres of proposed project impacts on the western portion of the wetland (e.g., increased fluctuations in water level, change in duration of ponded water) this could have an impact on amphibian breeding.

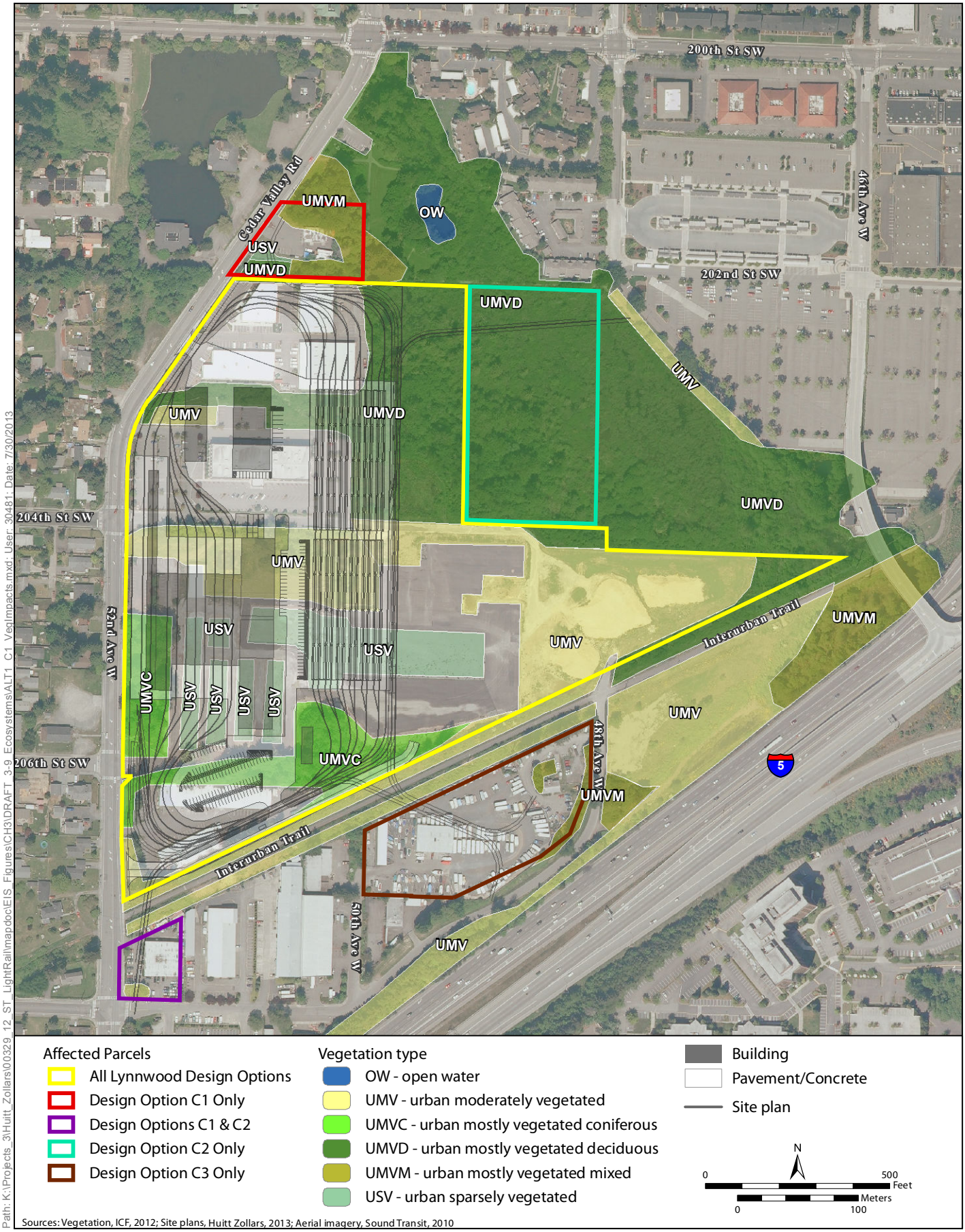

Figure 4.2-1a: Lynnwood Alternative—Vegetation Impacts
Ecosystems Technical Report

Figure 4.2-1b: Lynnwood Alternative, BNSF Storage Tracks*—Vegetation Impacts
Ecosystems Technical Report
*The BNSF Storage Tracks are located in Bellevue

Figure 4.2-2: BNSF Alternative—Vegetation Impacts
Ecosystems Technical Report

Figure 4.2-3: BNSF Modified Alternative—Vegetation Impacts
Ecosystems Technical Report

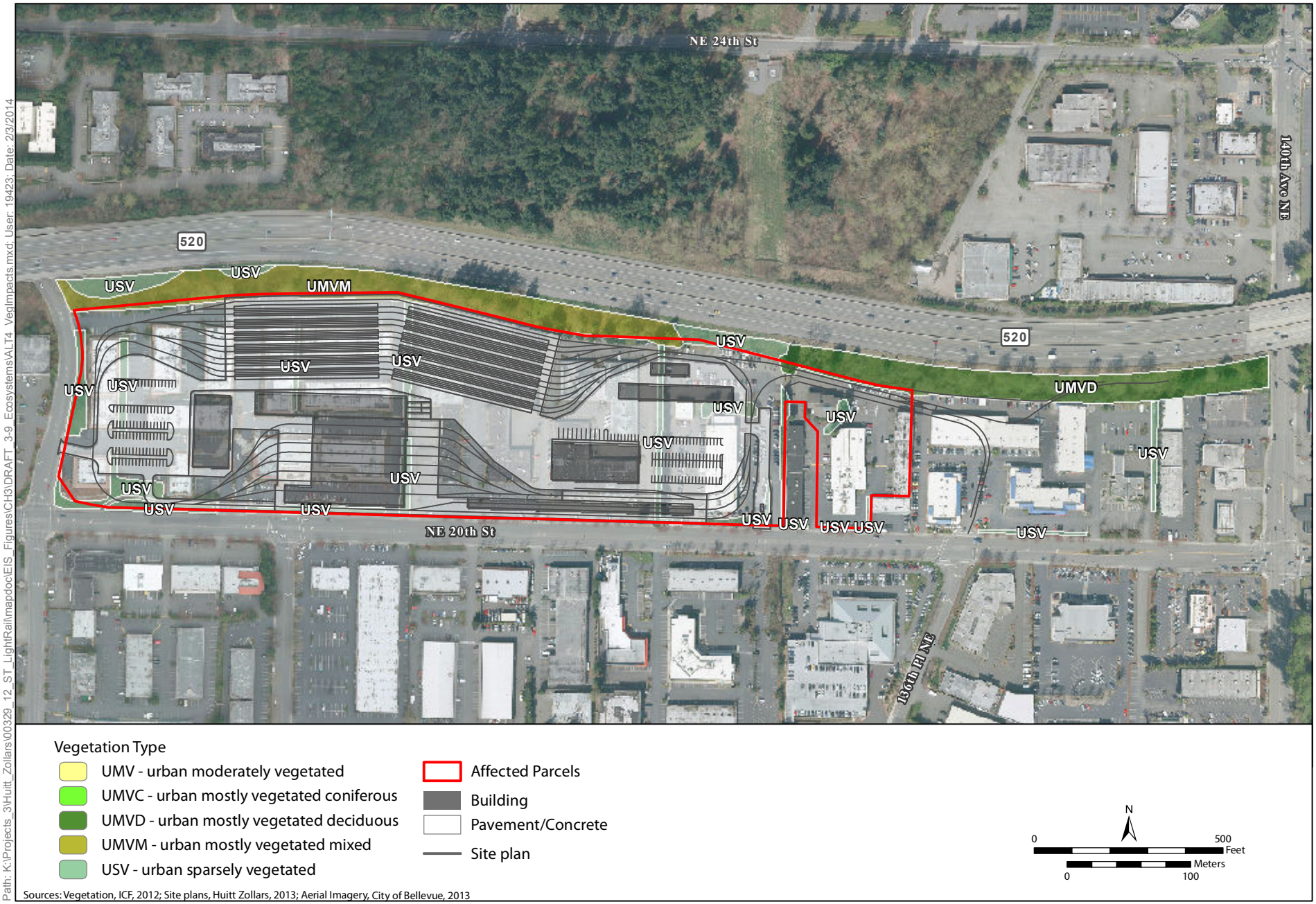

Figure 4.2-4: SR 520 Alternative—Vegetation Impacts
Ecosystems Technical Report

Design Option C2 of the Lynnwood Alternative would have a greater impact on wildlife than Design Option C1 or Design Option C3. Under Design Option C2, the lead track running east from the site would be constructed near the middle of the wetland. Lead tracks for Design Option C1 and Design Option C3 follow currently developed routes along the edges of the wetland. Thus Design Option C2 has a greater potential to bring noise and disturbance through the middle of the wetland.

Design Option C1 and Design Option C3 would have less impact in terms of habitat fragmentation and human disturbance because they would follow already developed routes. Under Design Option C1, lead tracks would follow I-5 and 52nd Avenue West, where noise and human disturbance from traffic are already high. The tracks would be located along the edge of the wetland, and thus would contribute less to habitat fragmentation than Design Option C2. Under Design Option C3, the lead tracks would enter and exit over I-5, an area already highly affected by noise and human activity and at the edge of the wetland as opposed to the middle.

A certain number of significant trees (mainly mature Douglas-fir trees) would be lost. Trees would be replanted to replace trees of significance as prescribed in the Lynnwood Municipal Code. However, there would be a temporal loss of mature trees from the site until replaced trees mature to the same age and stature as the existing trees (approximately 40 to 60 years).

The Bellevue component (BNSF Storage Tracks) of the Lynnwood Alternative would affect approximately 0.2 acres of forested habitat, some of which is wetland along the railroad tracks (Figure 4.2-1b). This alternative would not affect snag recruitment or foraging habitat for pileated woodpeckers in Wetlands E2-3 or E2-4. Given the highly (80 %) developed character of this site and the small amount of high quality habitat present, impacts from the project operation are expected to be minimal.

BNSF Alternative

Less than 2 acres of coniferous and deciduous forest (i.e., UMVM and UMVD) habitat would be removed permanently for the construction of the BNSF Alternative (Figure 4.2-2). Much of this forest is composed of the small wetlands scattered within this site. This habitat is already highly fragmented and affected by traffic noise and surrounding development. The proposed project would increase the percent of the site that is developed from 81% to 93%. Nonetheless, it is currently used by songbirds, small mammals, and other species, and this habitat would be lost.

Overall permanent impacts on wildlife are expected to be minimal. In accordance with the Migratory Bird Treaty Act, Sound Transit would consult with USFWS on methods to implement during construction to avoid impacts on migratory birds.

The peregrine falcon eyrie at Bellevue Tower, should it become active again, would likely not be affected due to distance from the proposed project and the urban nature of the existing surroundings (i.e., peregrines nesting in Bellevue are already adapted to high levels of noise and human development). There would be no impacts on the osprey nest at Hidden Valley Sports Park, given the lack of suitable habitat at the Alternative site. This alternative would not affect snag recruitment or foraging habitat for pileated woodpeckers in Wetlands E2-3 or E2-4.

BNSF Modified Alternative

Approximately four acres of high quality mixed coniferous and deciduous forest (i.e., UMVM and UMVD) habitat would be removed permanently under the BNSF Modified Alternative (Figure 4.2-3).

Much of this forest is the small wetlands scattered within the eastern portion of the site, as well as the southern portion of Wetland E1-1a along the western portion of the site. This habitat is already highly fragmented and affected by traffic noise and surrounding development. Nonetheless, it is currently used by songbirds, small mammals, and other species, and this habitat would be lost.

Overall impacts on wildlife, both long and short-term, are expected to be minimal. In accordance with the Migratory Bird Treaty Act, Sound Transit would consult with USFWS on methods to implement during construction to avoid impacts on migratory birds.

The peregrine falcon eyrie at Bellevue Tower, should it become active again, would not be affected due to distance from the proposed project and the urban nature of the existing surroundings (i.e., peregrines nesting in Bellevue are already adapted to high levels of noise and human development). There would be no impacts on the osprey nest at Hidden Valley Sports Park given the lack of suitable habitat. This alternative would not affect snag recruitment or foraging habitat for pileated woodpeckers in Wetlands E2-3 or E2-4.

SR 520 Alternative

Due to the limited amount of high quality habitat and the highly developed nature of this site, this alternative would have the least impact on wildlife of the four action alternatives. Approximately 0.5 acre of deciduous and mixed forest (i.e., UMVD and UMVM) and 2 acres of landscaping (i.e., USV) would be removed permanently (Figure 4.2-4). The majority of this habitat exists in a linear corridor located between SR 520 and commercial development. The understory of these forested areas is dominated by invasive Himalayan blackberry. Although this area is mapped as high value habitat (i.e., UMVM and UMVD), the habitat value is diminished by small patch size, lack of corridors, noise, and human disturbance. There is limited connectivity to larger habitat patches (particularly for species that cannot fly) and the highway and other roads make dispersal of amphibians and most small mammals to and from this site unlikely. Birds and larger mammals face the hazard of having to cross SR 520 and major local roads to reach this habitat. A couple of snags that provide foraging habitat for woodpeckers would be lost. A few potential perch trees for raptors would also be lost.

4.3 Wetland Resources

Temporary construction and permanent operational wetland impacts are described by wetland, rather than by wetland vegetation type within each wetland due to the level of detail possible at this stage in the EIS process (e.g., based on a largely reconnaissance-level field evaluation without a formal delineation). Direct and indirect impacts are described where applicable. Impacts by wetland vegetation type in each wetland would be developed during preparation of the permit application for the selected alternative in order to appropriately quantify impacts and determine appropriate compensatory impacts for wetland functions.

4.3.1 Temporary Construction Impacts

4.3.1.1 Impacts Common to All Build Alternatives

The duration of temporary impacts on wetlands can vary depending on the type of vegetation that is affected. For instance, temporary impacts on emergent wetlands are generally short-term, lasting for a limited time, with functions returning to pre-impact performance fairly soon (about 1 year or

within one growing season of the impact). In contrast, temporary impacts on woody vegetation (i.e., shrubs and trees) are generally longer-term because although functions can be restored over time, there is a temporal loss in function because of the time required for shrubs and/or trees to grow enough to regain the stature and size necessary to provide preconstruction functions such as canopy habitat. Short-term and long-term temporary impacts were previously defined in detail Section 1.4.1.1.

Temporary impacts from construction activities include both those impacts that are direct and indirect. Potential temporary direct impacts include the following:

- Vegetation clearing and temporary site grading and filling for construction access. After construction, contours in these areas would be restored to pre-project conditions and typically planted with native vegetation. In those areas where existing vegetation is dominated by invasive species (such as Himalayan blackberry), temporary impacts of vegetation clearing would be an essential first step for ultimate restoration of native species.

Temporary indirect impacts on wetland function include the following:

- Soil compaction during construction activities that contributes to a decrease in soil permeability, infiltration, water-storage capacity, and vegetation regrowth
- Accidental spills of fuel oils, chemicals, and/or concrete leachate used during construction that affect aquatic species
- Noise and human activity associated with construction activities that temporarily displace wildlife
- Increase in sediment loading and turbidity from grading and filling activities that could run off into wetlands and affect water quality
- Temporary changes in wetland hydrology due to soil compaction or access road construction
- Introduction of invasive species as a result of disturbance and construction activity
- Reduction in extent of existing invasive species as a result of construction clearing and revegetation

4.3.1.2 Specific Temporary Construction Impacts of Alternatives

Construction of the proposed project could have temporary construction impacts on wetlands. However, the amount of wetlands that would be affected by project construction under the alternatives cannot be determined because construction limits have not been defined in all parts of the study area at the level of design used for the Draft EIS analysis.

The analysis of potential construction impacts did not identify any areas where temporary impacts could extend beyond the study area defined for the analysis of operational impacts. For the ecosystems analysis, all temporary impacts were assumed to occur within the defined project limits and it is assumed that the level of temporary construction impacts would be commensurate with the level of long-term impacts for each build alternative.

The following sections outline the range of potential temporary construction impacts on wetlands that could occur for each alternative. Actual impacts would depend on the final alternative selection and design, construction footprint and methods, BMPs implemented during construction, and

performance of post-construction restoration. Direct construction impacts will be identified during the Final EIS and permitting phases.

Lynnwood Alternative

Construction activities at the Lynnwood Alternative site are expected to include construction and fill within the western portion of Wetland N1-1, as well as Wetland N1-3 at the southwestern corner of the site and potential wetland PWLY2 in the center of the site. It is expected that the implementation of appropriate BMPs, as described in Section 4.1 and in Appendix A, would avoid or minimize temporary construction impacts on any portions of the wetlands not permanently affected by the project footprint. For example, the use of temporary work bridges, where appropriate, would minimize temporary construction impacts on the Scriber Creek/Wetland N1-1 complex during construction.

Design Option C1

Temporary impacts of Design Option C1 would be the same as those described above for the Lynnwood Alternative site, with the addition of possible temporary impacts on the narrow northwestern portion of Wetland N1-1 during the placement of the three guideway support footings which would be constructed in the northwestern arm of the wetland (Figure 4.3-1a). This could result in the temporary loss of wetland habitat during construction (as well as permanent impacts as described below in Section 4.3.2.2). Support footings at the extreme southwestern corner of the site would be constructed in wetland buffer (Wetland N1-3) and could result in temporary construction impacts.

Design Option C2

Temporary impacts of Design Option C2 would be the same as those described above for the Lynnwood Alternative site and for Design Option C2, except that this option would also include the placement of guideway support footings across the center of Wetland N1-1 (Figure 4.3-1a), resulting in the temporary loss of wetland habitat during construction (as well as permanent impacts as described below in Section 4.3.2.2). Temporary work bridges would be used, where appropriate, to minimize effects on this wetland complex during construction of these support footings.

Design Option C3

Temporary impacts of Design Option C3 would be the same as those described above for the Lynnwood Alternative site. None of the guideway support footings would be constructed in wetlands (Figure 4.3-1a). Support footings at the extreme southwestern corner of the site would be constructed in wetland buffer (Wetland N1-3) and could result in temporary construction impacts.

BNSF Storage Tracks

The BNSF Storage Tracks component of this alternative is expected to include construction and fill within several of the wetlands along the eastern side of the existing BNSF tracks (permanent impacts are described below in Section 4.3.2.2) (Figure 4.3-1b). It is expected that the implementation of appropriate BMPs, as described in Section 4.1 and in Appendix A, would avoid or minimize temporary construction impacts on any portions of the wetlands that would not be permanently affected by the project footprint site.

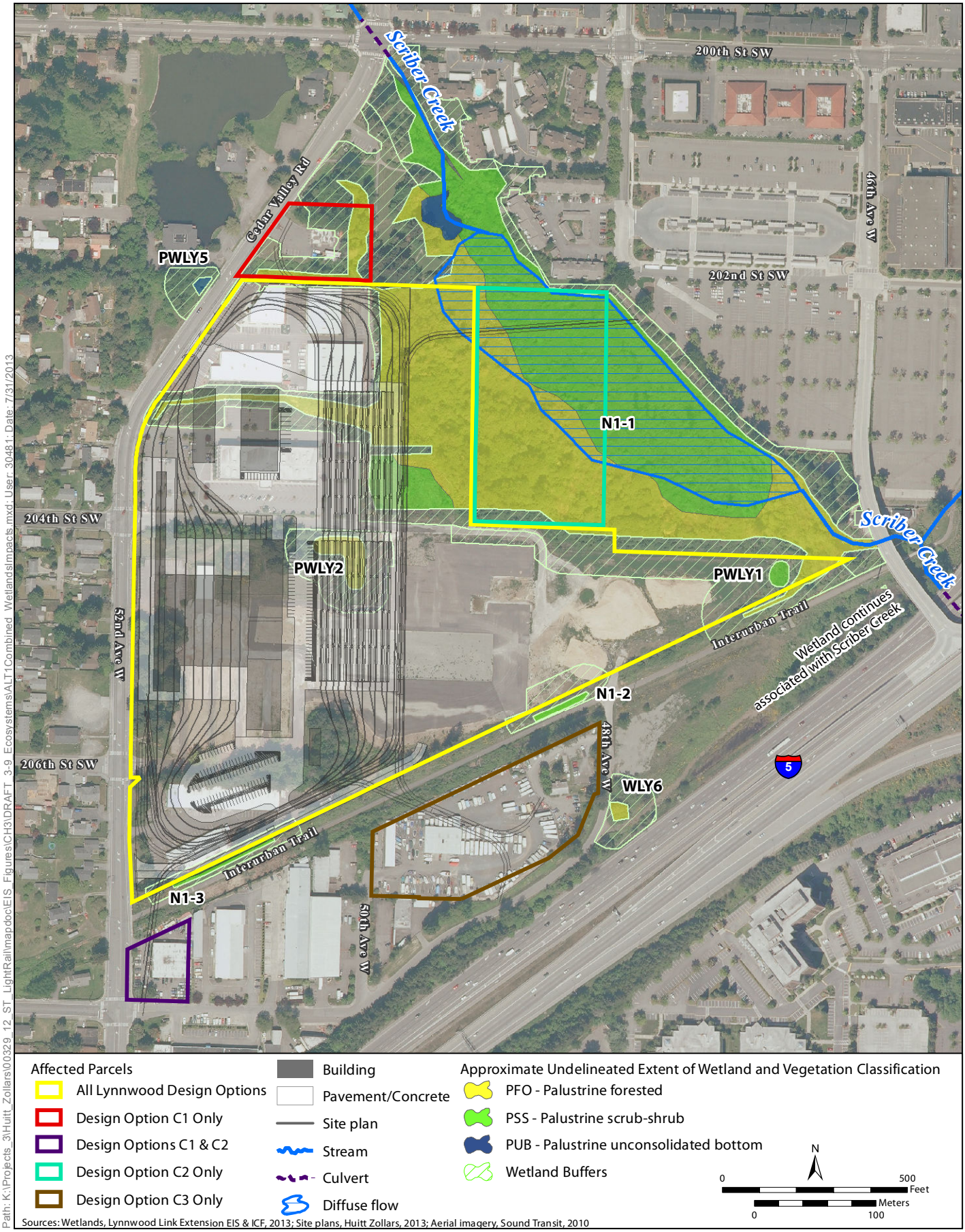

Figure 4.3-1a: Lynnwood Alternative—Wetland Impacts
Ecosystems Technical Report

Figure 4.3-1b: Lynnwood Alternative, BNSF Storage Tracks*—Wetland Impacts
Ecosystems Technical Report
*The BNSF Storage Tracks are located in Bellevue

BNSF Alternative

Construction activities associated with this alternative are expected to include construction and fill within at least a portion of all of the wetlands located along the eastern side of the existing BNSF tracks (permanent impacts are described below in Section 4.3.2.2). The potential types of temporary construction impacts of this alternative would be similar to those described above, in Section 4.3.1.1, *Impacts Common to All Build Alternatives*. It is expected that the implementation of appropriate BMPs, as described in Section 4.1 and in Appendix A, would avoid or minimize temporary construction impacts on any portions of the wetlands not permanently affected during construction activities this site.

BNSF Modified Alternative

The potential temporary construction impacts of this alternative would be the same as those discussed above for the BNSF Alternative, with the additional potential for temporary impacts on Wetlands E1-1a and E1-1b during construction. It is expected that the implementation of appropriate BMPs, as described in Section 4.1 and in Appendix A, would avoid or minimize temporary construction impacts on any portions of the wetlands not permanently affected during construction activities this site.

SR 520 Alternative

Construction activities associated with this alternative are expected to include construction and fill within three of the five of the wetlands (permanent impacts are described below in Section 4.3.2.2). The potential temporary construction impacts of this alternative would be similar to those described above, in Section 4.3.1.1-*Impacts Common to All Build Alternatives*. It is expected that the implementation of appropriate BMPs, as described in Section 4.1 and in Appendix A, would avoid or minimize temporary construction impacts on any portions of the wetlands not permanently affected during construction activities this site.

4.3.2 Permanent Operational Impacts

4.3.2.1 Impacts Common to All Build Alternatives

Direct Wetland and Buffer Impacts from the Facilities

The project limits include the OMSF footprint, including parking, roadway improvements, changes to storm drainage, and other ancillary features. Permanent direct impacts are those that occur inside the project limits where the permanent components of each alternative would occur. It is assumed that these areas would be permanently affected and all wetlands and functional portions of wetland buffers within these areas would be filled and all related functions lost in their entirety. Mitigation consistent with federal, state, and local requirements would be required for wetland impacts. Mitigation for buffer impacts may also be required under local Critical Area Ordinances.

Wetland and Buffer Impacts from the Elevated Guideways

Wetlands and wetland buffers occur under the elevated guideways linking the proposed project with the Lynnwood Link or East Link projects (as applicable). Impacts can occur to wetlands beneath such guideways, even if the direct fill footprint is confined to the area of the support

columns. However, estimating this impact is complicated and depends on multiple variables, such as slope, aspect, soil conditions, and stormwater dispersion from the elevated guideway. Wetlands typically receive water from groundwater or surface water sources. Vegetation within buffer areas typically receives water directly from precipitation. Elevated guideways can create a rainshadow effect and in some cases might also have a low clearance that could also limit sunlight. Sound Transit has observed situations at several locations along Sound Transit's Central Link route where vegetation replanted within buffers under the elevated guideway was having difficulty re-establishing due to limited summer water and/or light (Sound Transit 2011). All these variables make for a complex impact analysis that exceeds the site and design information available during the EIS development.

Therefore, for the purposes of this impact analysis, permanent impacts from the elevated guideways were calculated in a conservative manner, based on the overlap of the total area of the guideway on the wetland or wetland buffer. It is expected, however, that permanent impacts on wetlands associated with any elevated sections of guideway track can be avoided or further minimized during final design and during construction. During future design and permitting, impacts on wetlands under elevated portions of the structures would be evaluated more closely to determine whether the expected vertical clearance over wetlands would allow sufficient sunlight and precipitation to restore some wetlands and buffer functions.

Indirect Wetland and Buffer Impacts

Permanent indirect impacts might also occur as a result of construction and operation activities. Indirect wetland impacts are those areas of wetlands that will not be directly filled but could reasonably be expected to be vegetatively and/or hydrologically affected by the fill. An example is an area of wetland that is cut off/isolated from the main body of the wetland by the fill. This area might remain wetland but its water quality, hydrologic, and habitat functions are so reduced by its isolation and small size as to render it affected. The remaining portion of a buffer narrowed significantly because of construction may not provide functional buffer to the wetland. Potential permanent indirect impacts considered included the following:

- Conversion of forested to scrub-shrub wetland habitat under and along the sides of the elevated guideways by regular maintenance to prevent trees and branches from interfering with rail operation
- Alterations to vegetation community structure and species diversity caused by partial shading of vegetation from shadows cast beyond the elevated structure footprint
- Alterations to depth and duration of soil saturation and/or seasonal ponding due to isolation from main body of the wetland caused by fill
- Alterations to the vegetative character, interspersion of habitats, and complexity of wetland habitat functions caused by isolation of the wetland from the main body of the wetland by fill or by such a substantial reduction in the remaining portion of the wetland or wetland buffer that all habitat functions are eliminated

Mitigation consistent with federal, state, and local requirements would likely be required for indirect wetland impacts.

4.3.2.2 Specific Impacts of the Alternatives in Each Segment

Construction of the proposed project could have permanent operational impacts on wetlands and wetland buffers in the project vicinity. These include mostly direct and some potential indirect impacts. The following sections outline the range of potential impacts that could occur for each alternative. Actual impacts would depend on the final alternative selection and design, construction footprint and methods, BMPs implemented during construction, and performance of post-construction wetland and buffer restoration.

The potential permanent operational impacts by alternative are summarized in Table 4.3-1 and Figures 4.3-1 through 4.3-4 and described in detail below.

Table 4.3-1. Potential Permanent Operational Impacts on Wetland and Wetland Buffers

Wetland ID	Cowardin Class[a]	HGM Class[b]	Category[c]	Approximate Total Size (acres)	Direct Wetland Impacts (acres)	Indirect Wetland Impacts (acres)	Wetland Buffer Impacts (acres)[d]
Lynnwood Alternative, Design Option C1							
N1-1	PFO1/PSS1/ PEM1/PUB	Depressional/ Riverine	II	17	1.6	0.1	1.4
N1-2	PSS1	Depressional	III	0.1	0.0	0.0	0.0
N1-3	PSS1	Depressional	III	0.1	<0.1	<0.1	0.2
WLY6	PFO1	Depressional	III	0.05	0.0	0.0	0.0
PWLY1	PSS1	Depressional	III	0.1	0.0	0.0	0.0
PWLY2	PFO1	Depressional	III	0.3	0.3	0.0	0.0
PWLY5	PUB	Depressional	III	<0.1	0.0	0.0	0.0
Lynnwood Alternative, Design Option C1: Total Wetland Impacts					***1.9***	***0.1***	***1.6***
Lynnwood Alternative, Design Option C2							
N1-1	PFO1/PSS1/ PEM1/PUB	Depressional/ Riverine	II	17	1.8	0.1	1.4
N1-2	PSS1	Depressional	III	0.1	0.0	0.0	0.0
N1-3	PSS1	Depressional	III	0.1	<0.1	<0.1	0.2
WLY6	PFO1	Depressional	III	0.05	0.0	0.0	0.0
PWLY1	PSS1	Depressional	III	0.1	0.0	0.0	0.0
PWLY2	PFO1	Depressional	III	0.3	0.3	0.0	0.0
PWLY5	PUB	Depressional	III	<0.1	0.0	0.0	0.0
Lynnwood Alternative, Design Option C2: Total Wetland Impacts					***2.1***	***0.1***	***1.6***
Lynnwood Alternative, Design Option C3							
N1-1	PFO1/PSS1/ PEM1/PUB	Depressional/ Riverine	II	17	1.6	0.1	1.4
N1-2	PSS1	Depressional	III	0.1	0.0	0.0	0.0
N1-3	PSS1	Depressional	III	0.1	<0.1	<0.1	0.2
WLY6	PFO1	Depressional	III	0.05	0.0	0.0	0.0
PWLY1	PSS1	Depressional	III	0.1	0.0	0.0	0.0
PWLY2	PFO1	Depressional	III	0.3	0.3	0.0	0.0

Wetland ID	Cowardin Class[a]	HGM Class[b]	Category[c]	Approximate Total Size (acres)	Direct Wetland Impacts (acres)	Indirect Wetland Impacts (acres)	Wetland Buffer Impacts (acres)[d]
PWLY5	PUB	Depressional	III	<0.1	0.0	0.0	0.0
Lynnwood Alternative, Design Option C3: Total Wetland Impacts					***1.9***	***0.1***	***1.6***
Lynnwood Alternative, BNSF Storage Tracks							
E1-1b	PFO1/PEM1	Depressional	III	0.06	0.06	0.0	0.07
E2-1	PFO1	Depressional	III	0.4	0.0	0.0	0.08
E2-2	PFO1/PSS1	Depressional	III	0.02	<0.001	0.0	0.04
E2-3	RFO1	Depressional and Riverine	III	1.2	0.0	0.0	0.0
E2-4	PFO1/4	Depressional	III	5.5	0.0	0.0	0.0
E2-5	PFO1/PSS1	Depressional	IV	0.2	0.0	0.0	0.0
E2-6	PEM1	Depressional	III	0.06	<0.001	<0.01	0.0
E2-7	PFO1	Depressional	III	0.02	0.02	0.0	
Lynnwood Alternative, BNSF Storage Tracks: Total Wetland Impacts					***0.08***	***<0.01***	***0.19***
BNSF Alternative							
E2-1	PFO1	Depressional	III	0.4	0.02	0.0	0.25
E2-2	PFO1/PSS1	Depressional	III	0.02	0.02	0.0	0.0
E2-3	RFO1	Depressional and Riverine	III	0.6	0.0	0.0	0.0
E2-4	PFO1/4	Depressional	III	5.5	0.0	0.0	0.0
E2-5	PFO1/PSS1	Depressional	IV	0.2	0.0	0.0	0.0
E2-6	PEM1	Depressional	III	0.06	<0.01	<0.01	0.0
E2-7	PFO1	Depressional	III	0.02	0.02	0.0	0.0
BNSF Alternative: Total Wetland Impacts					***0.07***	***<0.01***	***0.25***
BNSF Modified Alternative							
E1-1a	PFO1/PSS1/ PEM1	Depressional and Slope	III	1.2	0.37	0.8	1.05
E1-1b	PFO1/ PEM1	Depressional	III	0.06	0.06	0.0	0.0
E2-1	PFO1	Depressional	III	0.4	0.04	0.0	0.28
E2-2	PFO1/PSS1	Depressional	III	0.02	0.02	0.0	0.0
E2-3	RFO1	Depressional and Riverine	III	0.6	0.0	0.0	0.0
E2-4	PFO1/4	Depressional	III	5.5	0.0	0.0	0.0
E2-5	PFO1/PSS1	Depressional	IV	0.2	0.0	0.0	0.0
E2-6	PEM1	Depressional	III	0.06	0.06	0.0	0.0
E2-7	PFO1	Depressional	III	0.02	0.02	0.0	0.0
BNSF Modified Alternative: Total Wetland Impacts					***0.6***	***0.8***	***1.33***
SR 520 Alternative							
E3-1	PFO1	Depressional	IV	0.2	0.0	0.0	0.18
E3-2	REM	Riverine	IV	0.2	0.2	0.0	0.0
E3-3	PSS1/PEM1	Depressional	III	0.1	0.1	0.0	0.0

Wetland ID	Cowardin Class[a]	HGM Class[b]	Category[c]	Approximate Total Size (acres)	Direct Wetland Impacts (acres)	Indirect Wetland Impacts (acres)	Wetland Buffer Impacts (acres)[d]
E3-4	PFO1	Depressional	III	0.1	0.0	0.0	0.02
E3-5	PFO1/PSS1/ PEM1	Depressional and Slope	III	0.6	0.09	0.0	0.09
SR 520 Alternative: Total Wetland Impacts					0.39	0.0	0.29

[a] *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979): PEM = palustrine emergent marsh; PSS1 = palustrine scrub-shrub, deciduous; PFO1= palustrine forested, deciduous; PFO1/4 = palustrine forested, mixed deciduous and coniferous; REM = riverine, emergent

[b] HGM = hydrogeomorphic classification

[c] Category is based on the *Washington State Wetland Rating System for Western Washington*(Hruby 2006), which the cities of Bellevue and Lynnwood adopted without modification.

[d] No buffer impacts if wetland is entirely affected.

Lynnwood Alternative

This alternative would result in fill within the western portion of the Scriber Creek wetland (i.e., Wetland N1-1) and direct impacts on the northern half of Wetland N1-3 (Figure 4.3-1a). Impacts on Wetland N1-1 would result in the reduction of forested and shrub wetland habitats, as well as the potential for changes to surface flow paths in the wetland associated with the area of diffuse flow where Scriber Creek merges into the wetland. Placement of fill in the western portion of the wetland would also reduce the wetland area available to store floodwaters in the Scriber Creek floodplain, thus partially reducing the wetland's water quality and hydrologic functions.

Design Option C2 would have the largest impact on wetland and wildlife habitat due to the elevated guideway crossing the center of the wetland. Wetland N1-1 provides a large area of wildlife habitat in a highly urbanized area, and is part of a habitat corridor that stretches along Scriber Creek through Lynnwood and into Mountlake Terrace. Wetland N1-1 provides a high level of water quality improvement and flood flow reduction functions due to its capacity to hold stormwater and flood flows from the creek and its density of woody vegetation which slows flood flows and traps sediment and nutrients. Impacts from the Lynnwood Alternative (all design options) would affect the wetland's ability to perform water quality and hydrologic functions, and would reduce the amount of habitat that provided for wildlife.

Impacts on this wetland could also adversely affect juvenile salmon that rear and overwinter in the wetland/diffuse stream channel complex. The elevated guideways proposed under Design Option 2 would preclude the development of mature forested vegetation within the wetland along the tracks and would thus reduce the recruitment of large woody debris into Scriber Creek and the wildlife habitat values provided by standing snags and downed wood in the wetland.

However, stormwater treatment and flow control measures are included under all the design options, which would be expected to detain and treat stormwater from the proposed project. This would at least partially compensate for the loss of stormwater detention and treatment functions currently provided by the wetland.

Figure 4.3-2: BNSF Alternative—Wetland Impacts
Ecosystems Technical Report

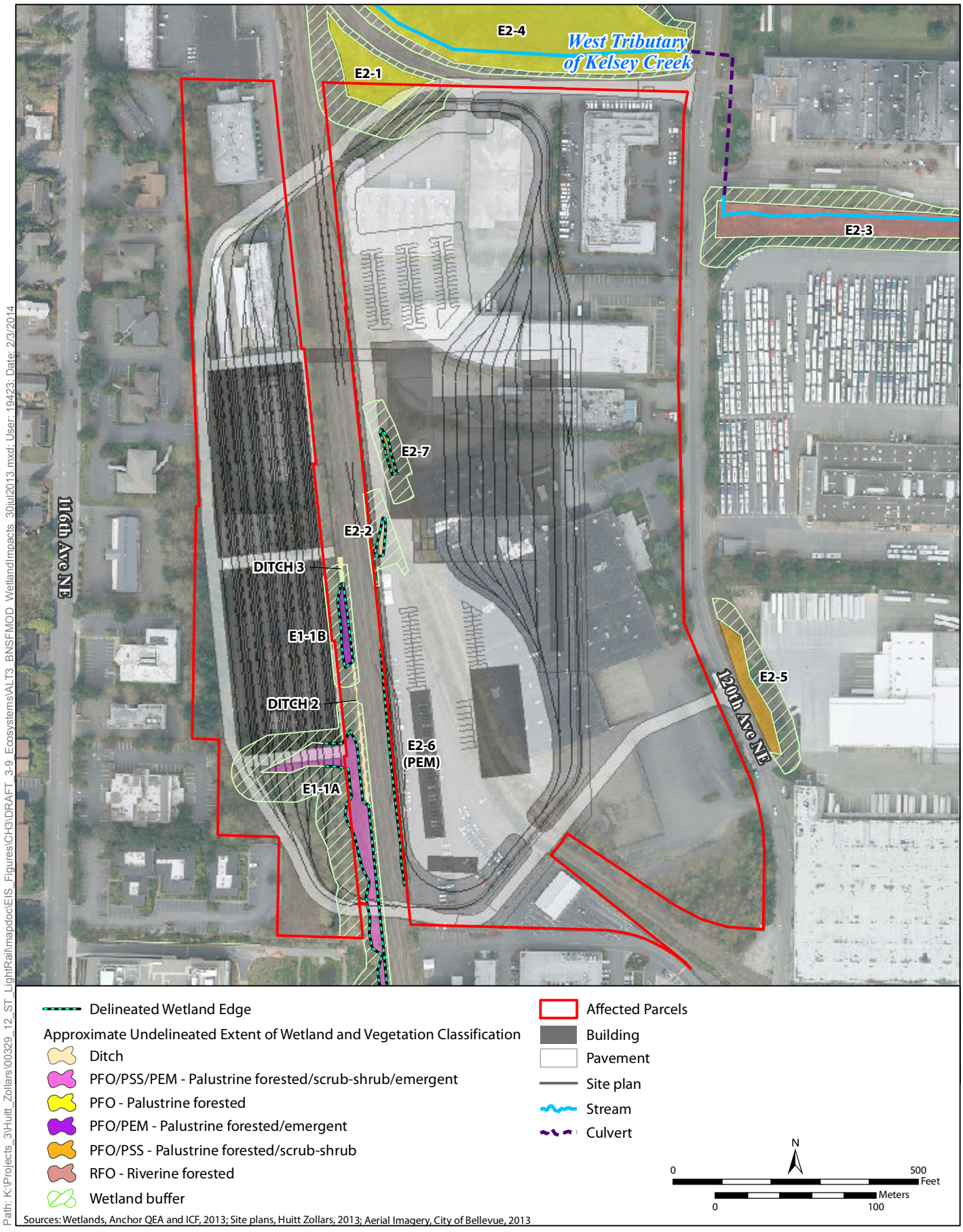

Figure 4.3-3: BNSF Modified Alternative—Wetland Impacts
Ecosystems Technical Report

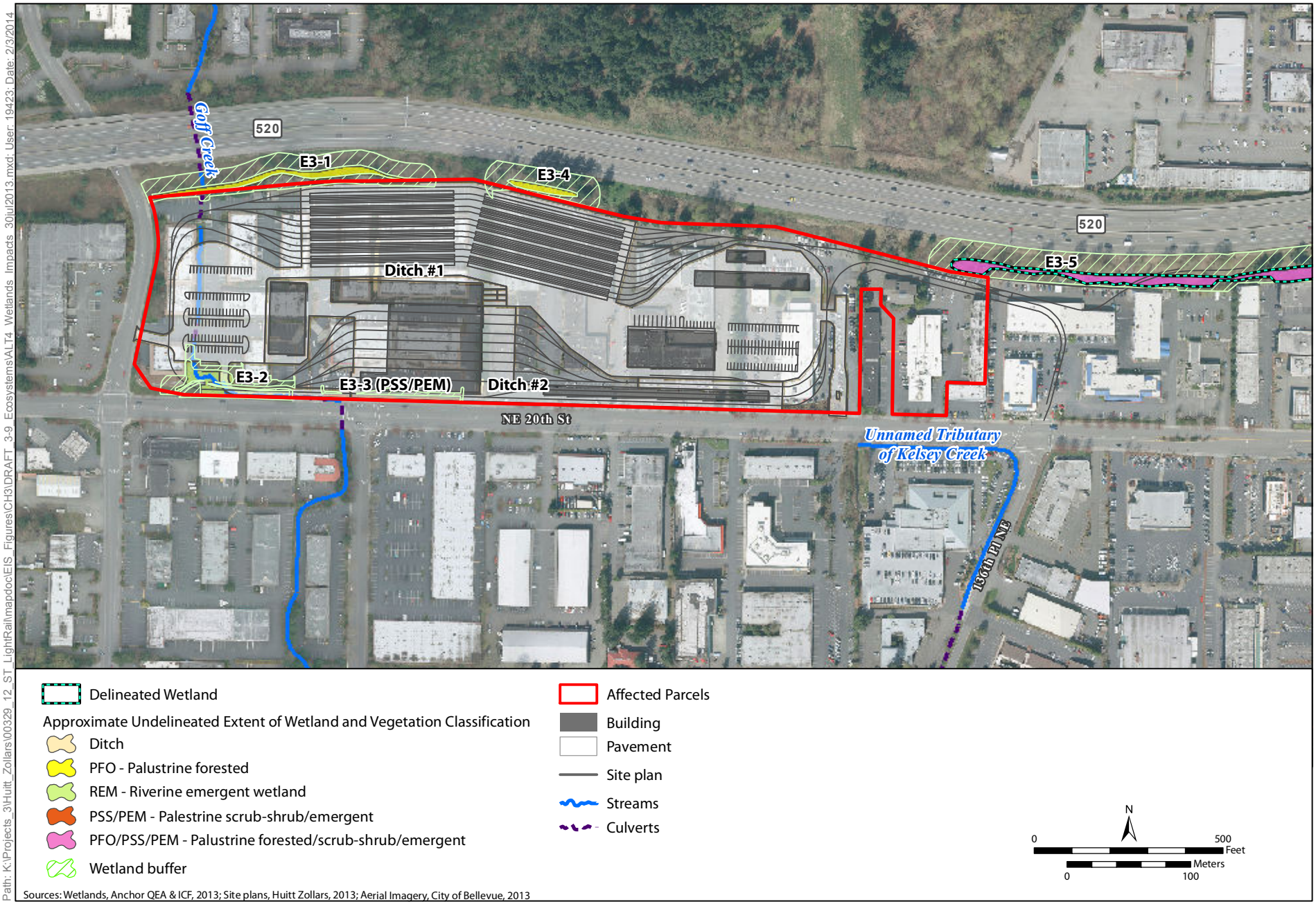

Figure 4.3-4: SR 520 Alternative—Wetland Impacts
Ecosystems Technical Report

It should be noted that approximately 0.4 acre of the narrow western arm of Wetland N1-1 and approximately 0.3 acre of the southwestern corner of Wetland N1-1 each appear to be potential mitigation sites constructed to compensate for wetland and/or buffer impacts. Both of these areas would be affected under all design options of this alternative. NGPA signage and native tree and shrub plantings were also noted around the narrow western arm of Wetland N1-1. The NGPA recording certificate for this area (#200405055120) specifically prohibits future development and requires any boundary adjustments to the NGPA be approved by the City of Lynnwood through a formal platting process. All design options of this alternative would affect the NGPA and trigger such a process for approval of any modification to the NGPA boundary to allow impacts on this portion of Wetland N1-1.

The northern half of Wetland N1-3 would be directly affected. Impacts on Wetland N1-3 would result in the reduction of scrub-shrub wetland habitat. Indirect impacts on the remaining southern sliver of this very narrow wetland are expected to eliminate all water quality, hydrologic, and habitat functions of this wetland and thus result in a total loss of the wetland.

Wetlands and wetland buffers under the elevated guideway associated with the Lynnwood Alternative would also be affected, as per the impact assumptions outlined above in Section 4.3.2.1.

Design Option C1

Wetland impacts associated with Design Option C1 would be similar to those described above for the Lynnwood Alternative site. This Design Option would result in approximately 1.6 acres of direct impact, 0.10 acres of indirect impact on Wetland N1-1 and approximately 1.4 acres of impact on Wetland N1-1's buffer (Figure 4.3-1a). Indirect impacts on the extreme western portion of the northwestern arm of the wetland are likely due to this area being isolated from the main body of the wetland by the tracks linking the proposed project to the Lynnwood Link Extension tracks (Figure 4.3-1a). The C1 Design Option is expected to result in approximately 0.2 acre less loss of habitat in the wetland complex adjacent to Scriber Creek than Design Option C2 because of the configuration of the track and the northwestern portion of Wetland N1-1.

All of Wetland N1-3 (approximately 0.1 acre) would be directly or indirectly affected as a result of this Design Option.

Design Option C2

Impacts on Wetlands N1-1 and N1-3 associated with Design Option C2 would be the same as those described above for the Lynnwood Alternative site, except that this Design Option would result in 0.2 acre more wetland impact than Design Option C1 (1.8 acres versus 1.6 acres) because of the track extending east through Wetland N1-1 to join track from the Lynnwood Link Extension (Figure 4.3-1a).

Design Option C3

Impacts on Wetland N1-1 and N1-3 associated with Design Option C3 would be the same as those described above for Design Option C1 (Figure 4.3-1a).

BNSF Storage Tracks

Wetland impacts associated with the BNSF Storage Tracks component of the Lynnwood Alternative would occur to Wetland E1-1b along the western side of the tracks, and to Wetlands E2-2, E2-6, and

E2-7 along the eastern side of the tracks (Figure 4.3-1b). A total of approximately 0.08 acre of wetland would be affected.

A total of approximately 0.19 acre of wetland buffer impact would occur under this alternative, affecting the buffers of Wetlands E1-1b, E2-1, E2-2, and E2-7.

BNSF Alternative

Wetland impacts associated with this alternative would occur to Wetlands E2-1, E2-2, E2-6, and E2-7, totally approximately 0.07 acre of direct wetland impact and approximately 0.25 acre of wetland buffer impact (Figure 4.3-2). This includes the complete fill of Wetlands E1-1b, E2-2 and E2-7, and the partial fill of Wetlands E2-1, and E2-6. Indirect wetland impacts would be expected to the southern portion of Wetland E2-6 due the filling of the northern portion of this narrow wetland.

BNSF Modified Alternative

Wetland impacts associated with this alternative would occur to Wetlands E2-1, E2-2, E2-6, E2-7, as well as to Wetland E1-1a and E1-1b, totally approximately 0.6 acre of direct wetland impact and approximately 1.33 acres of wetland buffer impact (Figure 4.3-3). This includes 0.4 acre of direct impact on Wetlands E1-1a and E1-1b, and 1 acre of Wetland E1-1a's buffer. Indirect wetland impacts would also be expected to the remaining portion of Wetland E1-1a (0.8 acre) due the degree of grading necessary for construction in this steeply sloped area, as well as to the southern portion of Wetland E2-6 due the filling of the northern portion of this narrow wetland.

The BNSF Modified Alternative would also include fill of Ditches #2 (approximately 349 linear feet) and #3 (approximately 63 linear feet) which are connected to Wetlands E1-1a and E1-1b.

SR 520 Alternative

Wetland impacts associated with this alternative would occur to three of the five wetlands within this site (Figure 4.3-4). The SR 520 Alternative would also include substantial modifications to Ditches #1 and #2.

This alternative would result in 0.39 acre of direct wetland impact on Wetlands E3-2, E3-3, and E3-5 and 0.29 acre of wetland buffer impact. Wetland E3-2 currently provides a limited floodplain for Goff Creek; Wetland E3-3 drains through pipes to Goff Creek. It should be noted that Wetland E3-3 (0.1 acre) appears to be a mitigation site constructed to compensate for wetland impacts.

The entirety of both Ditches #1 and #2 would also be filled and/or piped, totaling approximately 226 linear feet of Ditch #1 and approximately 20 linear feet of Ditch #2.

Chapter 5
Potential Mitigation Measures

Sound Transit's policy [Executive Order No. 1, Establishing a Sustainability Initiative for Sound Transit (2007)] on ecosystem mitigation is to avoid impacts on environmentally sensitive resources and provide adequate mitigation to ensure no net loss of ecosystem function and acreage as a result of agency projects. The OMSF project would mitigate impacts on ecosystem resources in accordance with the mitigation sequencing requirements established by NEPA, the CWA, and local Critical Areas Ordinances.

According to NEPA (40 Code of Federal Regulations [CFR] paragraphs 1508.20), mitigation for ecosystems impacts is based on a hierarchy of first avoiding the impact, then minimizing the impact by limiting the degree or magnitude of the action, rectifying the impact by restoring, repairing, or rehabilitating the affected environment, reducing or eliminating the impact over time, and finally compensating for any remaining unavoidable adverse impacts by providing substitute resources or environments.

As described below, the build alternatives for the proposed project would avoid or minimize potential impacts on ecosystems resources whenever practicable, and Sound Transit is committed to providing compensatory mitigation when avoidance is not practicable.

5.1 Avoidance and Minimization

The avoidance and minimization of impacts was a guiding principle in the preliminary design of the build alternatives. The build alternatives for the proposed project would avoid or minimize potential impacts on ecosystems resources whenever practicable. Sound Transit would comply with standard specifications, BMPs, and applicable federal, state, and local mitigation requirements during design, construction, and post construction activities. Sound Transit would meet all regulatory requirements and continue to implement proactive avoidance and minimization measures related to these BMPs in adherence with federal, state, and local regulations.

5.1.1 Construction Best Management Practices

BMPs have been developed to avoid and minimize impacts during construction. These BMPs involve implementing conditions set forth in a Hydraulic Project Approval (HPA), in WAC 220-110-070, for installing culverts during construction, Section 401 and Section 404 of the CWA, the National Pollutant Discharge Elimination System (NPDES) permit, and the development of a Stormwater Pollution Prevention Plan (SWPPP) that prescribes implementation of measures for identifying, reducing, eliminating, or preventing on-site sediment and erosion problems which could affect aquatic resources, wetlands, and associated wildlife habitat. Sound Transit or its construction contractor would also implement construction BMPs that would apply to all ecosystem sensitive areas. These include delineating construction limits with fencing and signage to prevent inadvertent impacts on riparian vegetation, wetlands, upland vegetation to be preserved, or other sensitive sites outside of construction limits and development of a Temporary Erosion and Sediment Control (TESC) plan to address the potential for erosion during construction. Example BMPs that would be

implemented under the TESC plan include silt fences, protective ground covers, and straw bales in drainage features.

BMPs would be implemented to limit soil compaction in sensitive areas, and temporary work bridges could be used in extremely sensitive areas, such as the Scriber Creek wetland complex. BMPs would be employed for fish and aquatic habitat protection. In-water and over water work will be avoided, except for the SR 520 Alternative, which would require piping a portion of Goff Creek. However, most construction activities will be conducted in the dry, before the stream reach is diverted. Efforts will be conducted to rescue any aquatic species, prior to dewatering or diverting any stream reaches. Disturbed or temporarily cleared riparian vegetation will be replanted, as soon as practicable, with suitable native species.

If an HPA is required, all work would comply with the terms and conditions set forth in the HPA issued for the project by the WDFW. Seasonal restrictions (i.e., work windows) would apply to work conducted below the ordinary high water mark (if any should be required). If any culverts need to be installed or extended on fish-bearing or potentially fish-bearing streams (e.g., during mitigation for Goff Creek impacts), design and construction would comply with WAC 220-110-070 regarding fish passage requirements. Any affected streambeds and stream banks would be restored after in-water work.

For water quality protection, the project would obtain a construction stormwater general permit for coverage under the NPDES permit program, which is required for certain construction activities. The goal of the permit is to reduce or eliminate stormwater pollution and other impacts on surface waters from construction sites. The project must also develop a construction stormwater pollution prevention plan that implements BMPs for identifying, reducing, eliminating, or preventing sediment and erosion problems on site. The construction stormwater pollution prevention plan would include a TESC plan; spill prevention, control, and countermeasures plan; concrete containment and disposal plan; dewatering plan; and a fugitive dust plan.

Measures would be implemented before and during project construction to avoid or minimize effects on vegetation and wildlife resources. These strategies would be implemented along with others designed to avoid or minimize effects on other resources, such as streams, wetlands, and soils. Examples of these strategies are minimizing vegetation clearing, restoring temporarily affected areas, preparing and implementing a revegetation plan, and implementing construction methods to avoid impacts on migratory birds. In accordance with federal, state, and local requirements and guidance, Sound Transit would implement appropriate measures to minimize the risk of introduction and spread of noxious and invasive species.

5.1.2 Design and Operation Best Management Practices

Sound Transit would also implement design and operation BMPs for permanent stormwater runoff treatment and flow control. These could include natural or engineered dispersion BMPs; biofiltration BMPs such as vegetated filter strips, biofiltration swales, or ecology embankments; wet-pool BMPs; and infiltration BMPs. The project would route drainage to maintain existing stream basin contributing areas.

5.2 Rectifying and Reducing Impacts over Time

To the extent that impacts cannot be avoided or minimized through BMPs, Sound Transit would implement restoration measures to rectify temporary impacts and reduce their effects over time. Immediately following construction in each project segment, Sound Transit would begin restoring temporarily disturbed wetlands, streams (if any work occurs below the OHWM of any streams), and buffer areas. The length of time that would be required for site restoration to effectively replace habitat functions would vary. Temporarily disturbed wetlands, streams, and their buffers would be restored to pre-construction conditions where feasible and planted with appropriate native species when construction activities are finished. Sound Transit will conduct detailed site surveys to reestablish topography. Restoration will include soil amendment and vegetation replacement. Upland forested vegetation disturbed within construction staging areas will be revegetated with native species within 1 year following construction. Invasive, nonnative vegetation will be removed permanently from temporarily affected areas to improve the overall habitat for wildlife.

5.3 Compensatory Mitigation

To the extent that impacts cannot be avoided or minimized through BMPs, or rectified after construction, Sound Transit would implement additional measures to reduce adverse effects and provide compensatory mitigation measures where adverse effects are unavoidable.

Each of the alternatives has the potential to permanently affect wetland and wetland buffer habitats. Sound Transit has committed to achieving no net loss of wetland function and area on a project-wide basis. Compensatory mitigation would be conducted in accordance with applicable federal, state, and local requirements and guidelines. These include the federal *Final Compensatory Mitigation Rule* (40 CFR Part 230); interagency guidance prepared by Ecology, the U.S. Army Corps of Engineers, and U.S. Environmental Protection Agency in *Wetland Mitigation in Washington State* (Washington State Department of Ecology et al. 2006); and local Critical Areas Ordinances for the Cities of Lynnwood and Bellevue.

The federal *Final Compensatory Mitigation Rule* (*Federal Register* CFR Part 230, Volume 73 No. 70, 19594–1970540) specifies that selection of mitigation sites be conducted with a watershed approach and that compensatory mitigation for wetland impacts be accomplished preferentially by the use of approved mitigation banks, then by the use of in-lieu fee programs, and finally through permittee responsible, project specific mitigation.

Mitigation for unavoidable impacts on other resources (e.g., streams, stream buffers, and fish and wildlife habitat/habitat for species of local importance) that are protected under local critical areas ordinances would also be conducted in accordance with the requirements of those ordinances (i.e., BMC 20.25H.080 and 20.25H.085 for streams and 20.25H.160 for habitat associated with species of local importance; LMC 17.10.064 for streams and 17.10.081 for wildlife). Sound Transit will also adhere to local ordinances regarding tree replacement ratios (e.g., replacement of significant trees per the LMC).

Habitat improvements to mitigate for effects on aquatic resources will provide the most benefits if they occur downstream of existing anadromous fish passage barriers (i.e., downstream of Bel-Red Road for impacts on Goff Creek or West Tributary of Kelsey Creek, and the lower reaches of Scriber Creek). Sound Transit will work with the cities of Lynnwood and Bellevue to define appropriate

mitigation that is consistent with, and complimentary to, local plans for ecosystem restoration. Mitigation could be also accomplished through a combination of site specific actions, and more basin-wide or programmatic actions such as by creating wider stream or riparian buffers, restoring native riparian areas, removal of nonnative, invasive vegetation, supporting environmental education, and through improved stormwater management.

For example, Sound Transit has met with the City of Bellevue to discuss the City's plans for daylighting and restoring portions of Goff Creek downstream of the SR 520 Alternative site and upstream of Bel-Red Road and to remove fish passage barriers. Sound Transit will continue to work with the city to determine ways in which mitigation for impacts on Goff Creek could be completed in compliment with the City's vision for the Bel-Red Corridor and restoration of Goff Creek and improving fish passage within the Unnamed Tributary of Kelsey Creek (City of Bellevue 2012).

5.3.1 Approved Mitigation Bank

Currently, there are no approved mitigation banks with service areas that include the subbasins in which wetland impacts would occur under the action alternatives. Although it is possible that a bank could become certified with service in the project area in the future, mitigation banking projects take considerable lead time for planning and approval.

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

King County has developed an in-lieu fee program called the Mitigation Reserves Program, which was approved by the U.S. Army Corps of Engineers in March 2012 (King County 2013b). As of February 2012, the program is available throughout unincorporated King County. The program may be available to project proponents (such as Sound Transit) working within incorporated cities if the city codes allow it and if the city and King County have an agreement in place. However, as of February 2012 there are no such agreements in place (King County 2013c).

The program includes service areas within the King County watersheds affected by the OMSF (i.e., Cedar River/Lake Washington and Sammamish River). Sound Transit would discuss this program with the Cities of Lynnwood and Bellevue to determine whether this program could be applicable to the OMSF.

5.3.3 Project-Specific Mitigation Developed by Sound Transit

Lacking an approved mitigation bank, and if agreements to utilize the King County Mitigation Reserves Program cannot be reached, Sound Transit would mitigate for unavoidable impacts through permittee-responsible, project specific mitigation in accordance with the mitigation ratios specified in the Lynnwood and Bellevue critical area codes and in accordance with the procedures outlined by Ecology and the Corps for selecting mitigation sites using a watershed approach (Hruby et al. 2009). Sound Transit would also utilize Ecology's credit-debit tool, in conjunction with each jurisdiction's critical area mitigation ratio requirements, to determine the appropriate amount and types of compensatory mitigation to appropriately compensate for the specific functions and degree of functions provided by the types of wetland impacts (Hruby 2012).

5.3.3.1 Mitigation for Impacts from the Lynnwood Alternative

Sound Transit would utilize the wetland mitigation ratios specified in the Lynnwood critical areas code (17.10.055), to propose mitigation for unavoidable wetland impacts. Compensatory mitigation ratios are specified by wetland category, assuming wetland creation or restoration in the same drainage area as defined by the City's comprehensive flood and drainage management plan, as follows:

- Category I: 6:1
- Category II: 3:1
- Category III: 2:1
- Category IV: 1.5:1

Consequently, the 1.6 to 1.8 acres of impact on the Scriber Creek wetland (Wetland N1-1, Category II) and the 0.4 acres of impact on Wetlands N1-3 and PWLY2 (Category III), would require at least 5.6 to 6.2 acres of mitigation according to the Lynnwood requirements.

A larger area of mitigation could be required under Ecology's credit-debit tool if portions of Wetland N1-1 are determined to be mitigation for past impacts on wetlands.

Given the high functions of the Scriber Creek wetland (Wetland N1-1) and the potential for impacts on an area that may be compensatory mitigation for past wetland impacts, a larger area of mitigation could be required under Ecology's credit-debit tool, particularly in the absence of a basin plan, and for the loss of forested wetland communities if mitigation is concurrent (or delayed in time) relative to the proposed impacts.

Opportunities

Specific compensatory mitigation sites for unavoidable impacts on wetlands (and other ecosystem resources) will be determined during final design and project permitting. Currently identified opportunities include wetland and stream mitigation opportunities present in the Scriber Creek vicinity near the Lynnwood Transit Center. Mitigation opportunities exist on parcels that are under both public and private ownership, including parcels that could be acquired by Sound Transit because they intersect with areas needed for the Lynnwood Link Extension light rail right-of-way. These mitigation opportunities may include wetland creation, restoration, or enhancement.

5.3.3.2 Mitigation for Impacts from the BNSF Alternative, BNSF Modified Alternative, and SR 520 Alternative

Sound Transit would use the wetland mitigation ratios specified in the Bellevue critical areas code (20.25H.105.C), to propose mitigation for unavoidable wetland impacts. Compensatory mitigation ratios are specified by wetland category, assuming wetland creation or restoration on-site and in-kind, and concurrent with the impact, as follows:

- Category I: 6:1
- Category II: 3:1
- Category III: 2:1
- Category IV: 1.5:1

Consequently, the range of direct impacts (0.07 to 0.6 acre, depending on alternative) to the Category III and Category IV wetlands in the Goff Creek and West Tributary of Kelsey Creek basins would require approximately 0.2 to 1.2 acres mitigation according to the Bellevue requirements. Additional mitigation may be required for indirect impacts, such as to Wetlands E1-1a and E2-6. Similar to the Ecology credit-debit tool, Bellevue also requires consideration of the particular functions provided by each wetland when choosing sites and designing wetland mitigation.

A larger area of mitigation could be required under Ecology's credit-debit tool if all or part of Wetland E3-3 is determined to be mitigation for past impacts on wetlands.

Opportunities

Specific compensatory mitigation sites for unavoidable impacts on wetlands, wetland buffers, stream corridors, and other ecosystem resources will be determined during final design and project permitting. Currently identified opportunities include the potential for improving fish passage within the West Tributary Kelsey Creek, implementing other habitat restoration and water quality improvements, and for completing wetland and stream mitigation in conjunction with the City's plans for daylighting and restoring portions of Goff Creek downstream of the SR Alternative site and upstream of Bel-Red Road. The removal of fish passage barriers is part of the City's vision for the Bel-Red Corridor (City of Bellevue 2012). Mitigation for the SR 520 Alternative could also include rerouting Goff Creek to a partially daylighted channel along the western and southern edges of the SR 520 Alternative site.

Barrier removal is generally viewed to be one of the more cost-effective approaches to riverine habitat restoration in Pacific Northwest ecosystems (Beechie et al. 2010). However, in watersheds that are highly fragmented by numerous fish passage barriers and degraded by extensive urban development, barrier removal may not realize substantial benefit unless it is implemented in the context of a broader restoration strategy. Sound Transit will coordinate with local and state agencies to identify habitat mitigation measures that will provide the greatest benefit to ecosystem function in the Kelsey Creek and Scriber Creek watersheds.

Chapter 6
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Appendix A

Best Management Practices for Sensitive Ecosystem Resources

Appendix A

Best Management Practices for Sensitive Ecosystem Resources

The following list of measures is a compilation of best management practices (BMPs) that can be used to avoid and minimize temporary construction and permanent operational impacts of the East Link project on sensitive ecosystem resources. These BMPs are either required by state or federal agencies to obtain permits required for the project or may be required to comply with typical permit conditions. They are based on Sound Transit's knowledge of permit requirements and experience with conducting environmental compliance and permitting for numerous other projects in the Puget Sound area.

Construction-Related BMPs

General BMPs for All Sensitive Areas

The project would delineate construction limits for vegetated and habitat areas that may be disturbed during construction. The intent is to prevent unintended impacts on riparian vegetation, wetlands, woodlands, and other sensitive sites outside of the construction limits. The construction limits would be clearly marked with high-visibility construction fencing prior to any ground-disturbing or construction-related activities. There would be no direct site disturbance outside of the construction limits.

Soil or rock stockpiles, excavated materials, or excess soil materials would be prevented from eroding into sensitive habitats, including stream channels, wetlands, and riparian areas outside of the construction limits by high water or storm runoff. Sound Transit or its construction contractor would develop a Temporary Erosion and Sediment Control plan that would be implemented during construction. This TESC plan would address potential erosion during construction. The contractor would implement the plan before discharging or allowing runoff from the site. Monitoring requirements specified in the TESC would provide feedback to make sure that the erosion control practices are operating properly and effectively. BMPs would be implemented to limit soil compaction in sensitive areas.

Fish and Aquatic Habitat Protection

All work would comply with the terms and conditions set forth in the Hydraulic Project Approval (HPA) issued for the project by the Washington Department of Fish and Wildlife (WDFW). The HPA program is the vehicle through which WDFW regulates activities that affect the bed or flow of waters of the state for the protection of fish life. An HPA is required for construction or structural work associated with any bridge structure or culvert construction within or below the ordinary high water mark (OHWM) of waters of the state.

Seasonal restrictions (i.e., work windows) applied to work conducted below the OHWM would be as required by an HPA issued by WDFW and by the Section 404 permit issued by the U.S. Army Corps of Engineers (USACE).

In accordance with typical requirements of an HPA, when large woody debris must be moved to allow the reasonable use of an over-water or in-water facility, the large woody debris would be returned to the water downstream, where it would continue to provide aquatic habitat function.

All newly installed culverts would be in compliance with Washington Administrative Code (WAC) 220-110-070 (http://wdfw.wa.gov/hab/engineer/w2201170.htm) regarding fish passage requirements. Any affected streambeds, stream banks adjacent to culverts, and at the stream relocation reach, would be permanently restored after in-water work with plantings of native or approved woody and herbaceous species within one year of completion of each phase of construction. Bank protection would follow the guidelines set forth in WDFW's *Integrated Streambank Protection Guidelines* (http://wdfw.wa.gov/hab/ahg/ispgdoc.htm).

Water Quality

The federal Clean Water Act (CWA) (1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the CWA is the National Pollutant Discharge Elimination System (NPDES) permit program, which is administered by the U.S. Environmental Protection Agency (EPA). EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 of the Revised Code of Washington (RCW), which defines the Washington State Department of Ecology (Ecology) authority and obligations in administering the wastewater discharge permit program.

Ecology's construction stormwater general permit is required for certain construction activities. The goal of the permit is to reduce or eliminate stormwater pollution and other impacts on surface waters from construction sites.

The project must complete a Notice of Intent (NOI) for coverage under the permit. The project must also develop a Stormwater Pollution Prevention Plan that implements BMPs for identifying, reducing, eliminating, or preventing sediment and erosion problems on site.

Any materials placed below the OHWM (e.g., cobble or boulders for energy dissipation at culvert ends, streambed gravel or other substrates) would be relatively clean and handled in a way to minimize turbidity. Methods would be used such that it is not expected the project would exceed state water quality standards at the point of compliance (WAC chapter 173-201A) when flow is restored to the work site. To the fullest extent practicable, culverts would be installed, modified, and/or replaced in isolation from stream flow (if there is flow during the work window) by means of a temporary bypass flume, diversion culvert, or by temporarily pumping flow around the in-water work zone. Any temporary dewatering of the in-water work zone would be preceded by work area isolation and fish removal/relocation (as necessary). Fish handling would be conducted by a trained and qualified biologist. Turbid water produced during the course of in-water work would be prevented from discharging to fish-bearing waters or wetlands. Turbid wastewater may be routed to temporary or permanent detention facilities, or to upland areas that provide adequate rates of infiltration.

In accordance with conditions of a typical HPA, heavy equipment used during the course of in-water work would operate from above the OHWM wherever possible. Use of equipment below the OHWM would be limited to that necessary to gain position for work. Drive mechanisms would not enter or operate below the OHWM, except under the terms of the HPA issued by WDFW.

Uncured concrete and/or concrete byproducts would be prevented from coming in contact with streams or water conveyed directly to streams during construction. Any water having direct contact with uncured concrete would be contained and treated or removed from the site (as appropriate) to prevent discharge to streams or wetlands.

Installation of permanent footings and all drilled or pile-driven shafts (and excavated spread footings) below the OHWM (e.g., for culvert endwalls) would be conducted in a manner consistent with Section 404 and other permits issued for the project by the USACE and other parties (as applicable). When constructing drilled shafts, the contractor would ensure that all drilling equipment, drill recovery and recycling pits, and any waste or spoil produced are properly contained to prevent discharge of drill wastes or fluids to any surface water or wetlands.

In accordance with typical Section 401 permit requirements, turbidity would be monitored if in-water work occurs when water is flowing in the streams. Equipment (excluding track-mounted equipment, large cranes, and other relatively immobile equipment) would be refueled and maintenance activities conducted at a distance from the nearest wetlands, ditches, and flowing or standing water approved by regulatory permits. Appropriate spill prevention measures and fuel containment systems would be designed and implemented to completely contain a potential spill as specified in the Spill Prevention and Control Countermeasure plan. If flooding of the work area is expected to occur within 24 hours, all equipment and material would be evacuated from near-stream construction sites. An exception would be for efforts to avoid or minimize resource damage. All equipment that is used for in-stream or in-wetland work would be cleaned prior to operations below the OHWM. Wash-water would not be discharged directly into any water body without pretreatment.

Weed Control

If herbicide use is required during the monitoring period, the type and application of the pesticide should be chosen based upon City of Seattle Tier Tables (http://www.seattle.gov/environment/Pesticides.htm) or other locally accepted methodology. Additionally, Sound Transit's Integrated Pest management Plan (IPM) would provide guidance regarding pesticide use and IPM practices.

Design and Operation BMPs

The project would install permanent storm water runoff treatment and flow control facilities where needed according to the requirements of the 2004 Ecology *Stormwater Management Manual for Western Washington* or the most recently adopted manual.

The project would incorporate stormwater conveyance and management facilities that promote infiltration where applicable.

The project would select, design, and install runoff treatment BMPs that are best suited to the site conditions and best capable of achieving the required levels of treatment (subject to negotiation with the local jurisdiction and/or Ecology). These would or may include natural or engineered dispersion BMPs; biofiltration BMPs such as vegetated filter strips, biofiltration swales, or ecology embankments; wet-pool BMPs; and infiltration BMPs.

The project would not reroute existing drainage configurations to the extent that stormwater from one basin or subbasins is conveyed and discharged to another.

The project would implement IPM techniques, in accordance with current Ecology water quality agreements, to minimize the impact on aquatic and terrestrial environments.

Appendix B

Wildlife Function Field Data Form

Sound Transit East Link Wildlife Functions Field Data Form
(Adapted from WSDOT's Best Professional Judgment [BPJ] Characterization)

Project:
_____ Date: _____
Site ID:
_____ Biologist: _____

Function	Likely or Not Likely to Provide (State Your Rationale), Yes/No, or Number
F. General Habitat Suitability	
1. Area is not fragmented by development.	
2. Upland surrounding area is undeveloped.	
3. Area has connectivity with other habitat types.	
4. Diversity of plant species is high.	
5. Evidence of wildlife use, e.g., tracks, scat, gnawed stumps present.	
6. Distance to disturbance source and type.	
H. Habitat for Amphibians	
1. Cover (i.e., woody debris, rocks, and leaf litter) present.	
2. Woody debris present within area.	
3. Proximity to wetland habitats – distance and type.	
4. Lands within 1 km (0.6 mi) of area are > or = 40% undeveloped.	
5. Wetlands and/or an intermittent or perennial stream within 1 km (0.6 mi) of area.	
6. Presence of movement barrier between above wetland or stream and site being evaluated	
I. Habitat for Mammals	
1. Permanent water present within the area.	
2. Presence of emergent vegetation in areas of permanent water.	
3. Areas containing dense shrubs and/or trees are present.	
4. Interspersion between different strata of vegetation.	
5. Presence of slopes / banks suitable for denning.	
6. Evidence of wildlife use, e.g., dens, tracks, scat, gnawed stumps, etc.	
J. Habitat for Birds	
1. Forested and scrub-shrub classes present within the area.	
2. Average tree height.	
3. Average DBH.	

Function	Likely or Not Likely to Provide (State Your Rationale), Yes/No, or Number
4. Largest DBH and percent of trees in this class.	
5. Relative tree species diversity (L, M, H).	
6. Snags present in area.	
7. Cavities present in trees.	
8. Tree % canopy estimate.	
9. Shrub % canopy estimate.	
10. Adjacent area contains relatively undisturbed grassland or wetland shrub and/or forest habitats.	
11. Lands within 1 km (0.6 mi) of the area are greater than or = 40% undeveloped.	
L. Native Plant Richness	
1. Dominant and co-dominant plants are native.	
2. Area has three or more strata of vegetation.	
3. Area has mature trees (conifer, deciduous?).	
4. Number of species of trees.	
5. Area has well developed shrub layer.	
6. Number of species of shrubs.	
N. Uniqueness and Heritage	
1. Area contains documented occurrence of a state or federally listed threatened or endangered species.	
2. Area contains documented critical habitat, high quality ecosystems, or priority species respectively designated by the USFWS, the WDNR's NHP, or WDFW's Priority Habitats and Species Program.	
3. Area has biological, geological, or other features that are determined rare by the local jurisdiction.	
4. Area has been determined significant by the local jurisdiction because it provides functions scarce for the area	