3.10 Ecosystem Resources

This section evaluates the potential effects of the OMF South project alternatives on ecosystem resources, which include aquatic species and habitat; vegetation, wildlife, and wildlife habitat; and wetlands. Analyses in this section also evaluate potential effects on essential fish habitat and threatened and endangered species that would typically be addressed during consultation under Section 7 of the Endangered Species Act (ESA).

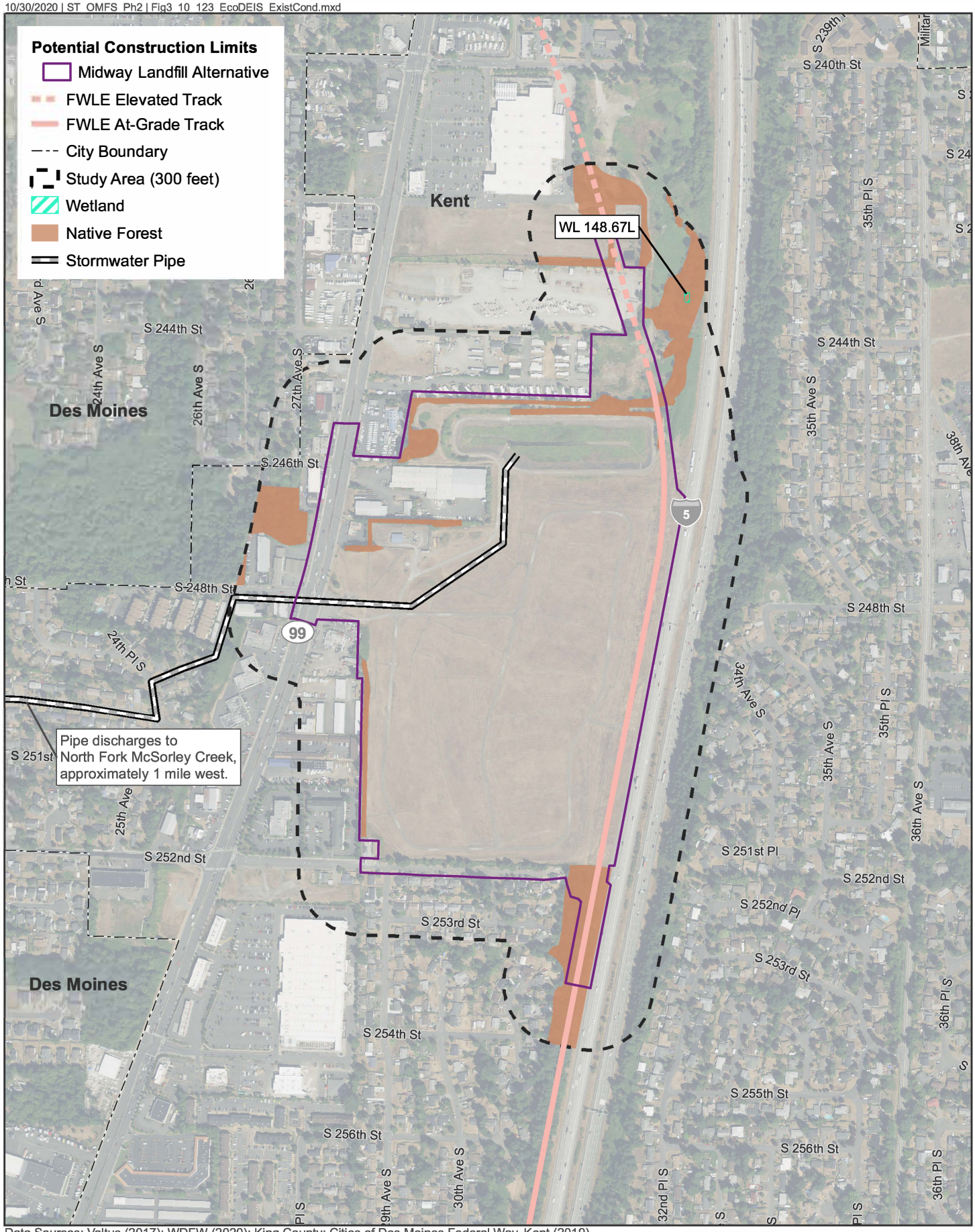
Ecosystem resources are protected by federal, state, and local regulations that govern planning, land use, and management activities affecting wetlands, streams, and fish and wildlife species and their habitats. These regulations, along with applicable guidance from agencies and consultation with local Indian tribes, prescribe procedures and substantive requirements that would apply during Environmental Impact Statement preparation and throughout construction and operation of the project. Sound Transit therefore considered these applicable regulations and guidance as part of this analysis. The Ecosystem Resources Technical Report (Appendix G3) provides detailed information on the regulations, analysis methods, affected environment, species, and impacts discussed in this section.

The study area for aquatic resources and wetlands includes all areas within 300 feet of the proposed construction limits of the project. This encompasses the area within which project construction and operation could deliver sediment or pollutants to streams and where vegetation clearing could affect riparian habitat quality. This distance is also the largest potential width of regulatory buffers for wetlands that may be required in the project area.

The study area for terrestrial resources includes areas within 200 feet of the proposed construction limits of the project. This represents a conservative estimate of the area in which project construction and operation could affect vegetation cover and habitat quality for terrestrial wildlife. To address wildlife potentially affected by project-related noise and human activity, resource analysts also reviewed documented occurrences of sensitive wildlife species within 0.25 mile of project construction areas.

3.10.1 Affected Environment

The following subsections identify the ecosystem resources that are known or expected to be present in the OMF South study area. Ecosystem resources in the study area are shown on Figures 3.10-1 through 3.10-3.



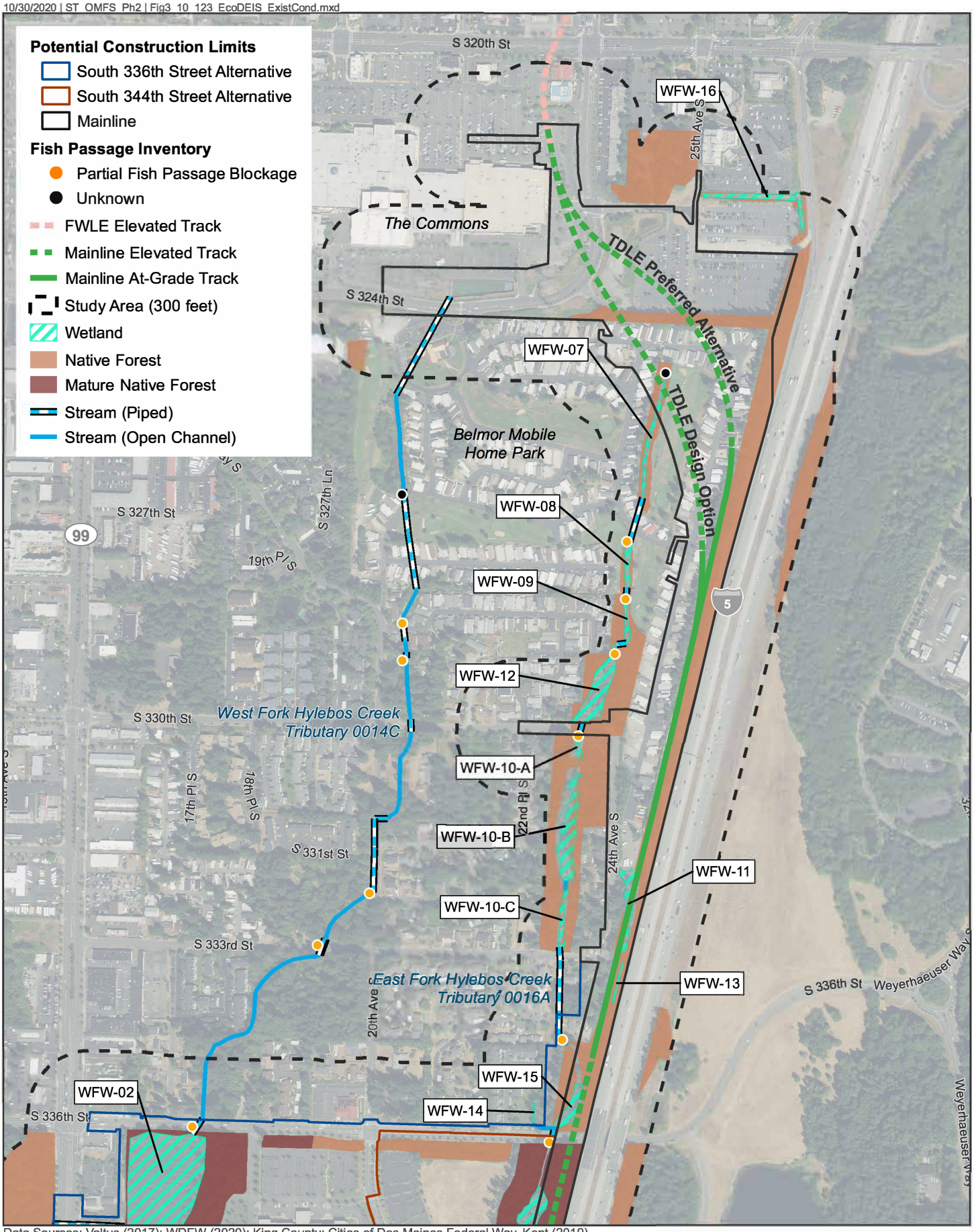
Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE 3.10-1
Ecosystem Resources
Midway Landfill Alternative

OMF South



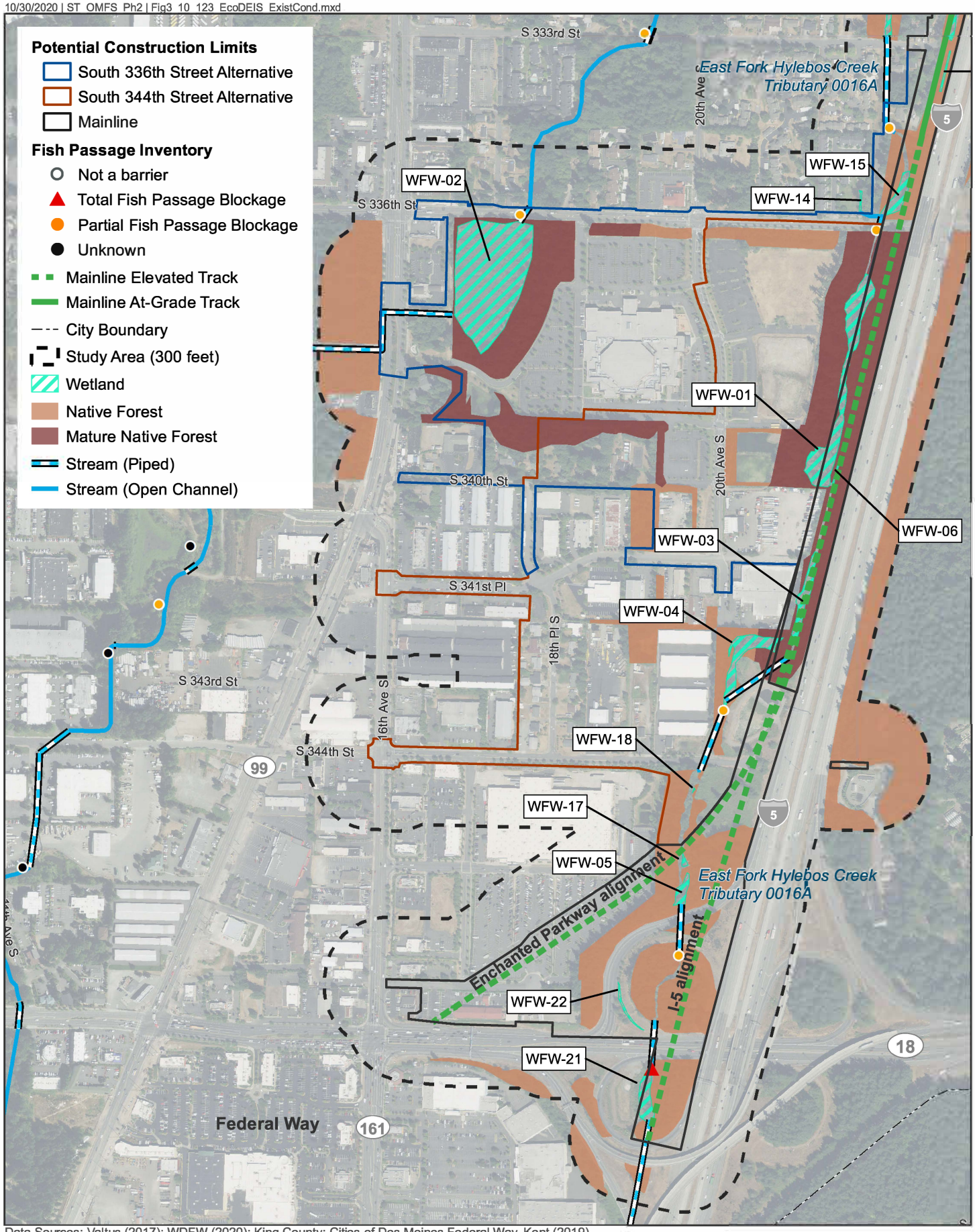
Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE 3.10-2
Ecosystem Resources
Mainline Track Options

OMF South



Data Sources: Valtus (2017); WDFW (2020); King County; Cities of Des Moines,Federal Way, Kent (2019).

N

0 500 1,000 Feet

FIGURE 3.10-3
Ecosystem Resources
South 336th and South 344th Street Alternatives

OMF South

3.10.1.1 Aquatic Species and Habitat

The assessment of aquatic species and habitat focused on features that may be affected by the project and that are directly related to ecological functions that support aquatic ecosystems. After collecting and reviewing existing information, biologists conducted detailed field reconnaissance and delineation surveys within the study area to identify and confirm ecosystem resources that could be affected. Based on the anticipated high level of interest from agencies, tribes, and the public — and to aid design work — biologists conducted formal delineations of the ordinary high water line of tributaries to Hylebos Creek. More detailed information about streams and aquatic species in the study area is available in Appendix G3, Ecosystem Resources Technical Report.

Habitat was assessed with the assumption that anadromous fish may one day be able to enter stream reaches where no natural barriers exist, even if human-created barriers currently prevent access. Using information gathered during field reconnaissance and from sources such as tribes, local jurisdictions, WSDOT, and fish passage barrier maps maintained by the Washington State Department of Fish and Wildlife (WDFW), biologists evaluated the accessibility of streams in the study area, identifying downstream impediments to fish passage.

Biologists classified streams according to the interim water typing definitions in WAC 222-16-031 and the applicable stream classification systems in local jurisdictions' critical areas regulations. Regulatory buffers were then identified based on each stream's water type or classification.

The study area includes two streams: East Fork Hylebos Creek Tributary 0016A and West Fork Hylebos Creek Tributary 0014C. Both are tributaries to Hylebos Creek, an independent tributary that discharges to the Hylebos Waterway along the eastern shore of Puget Sound's Commencement Bay in Tacoma. A third stream, North Fork McSorley Creek, receives discharge from a regional stormwater detention facility at the north end of the study area and would receive additional treated stormwater runoff from the Midway Landfill Alternative but would otherwise not be affected by project construction or operation.

Fish are not currently known or expected to be present in East Fork Hylebos Creek Tributary 0016A, West Fork Hylebos Creek Tributary 0014C, or North Fork McSorley Creek. None of these streams include any ESA-listed species or proposed or designated critical habitat for federally listed species. However, these streams are designated as essential fish habitat for Pacific salmon. Human-created barriers to fish passage currently prevent anadromous salmonids from entering the stream reaches in the study area (WDFW 2019a, 2019b). Stream reaches in the study area are not expected to support resident fish either, given the intermittent flow of the streams and the presence of barriers between the study area and potential population sources downstream. However, the basin size, channel width, and gradient of the streams indicate the potential to support fish use in the future. Coho salmon, steelhead, and cutthroat trout have been documented in East Fork Hylebos Creek approximately 1.9 miles downstream of the South 336th Street and South 344th Street alternatives (HDR 2014; WDFW 2019c). These species have also been documented in West Fork Hylebos Creek approximately 1.3 miles downstream of the South 336th Street Alternative (HDR 2014; WDFW 2019a).

North Fork McSorley Creek

No surface-flowing portions of North Fork McSorley Creek are within the OMF South study area for the Midway Landfill Alternative. However, a regional stormwater detention facility at the north end of the Midway Landfill site discharges to North Fork McSorley Creek, approximately 1.1 miles from the study area. For this reason, this analysis provides information about fish use in the stream reaches to which the stormwater detention facility discharges. North Fork McSorley Creek is a perennial stream and is considered a Type F stream based on its potential to support fish use.

Electrofishing surveys conducted by Washington Trout (2003) documented the presence of coastal cutthroat trout and western brook lamprey in reaches to which the stormwater detention facility discharges. According to WDFW (2019a), fall-run Chinook salmon, fall-run chum salmon, coho salmon, and winter-run steelhead could potentially use habitats in North Fork McSorley Creek 1.1 miles from the study area, but artificial barriers and/or degraded habitat quality currently preclude their presence.

East Fork Hylebos Creek Tributary 0016A

East Fork Hylebos Creek Tributary 0016A originates west of I-5, near The Commons at Federal Way and Belmor. The stream flows southward through the study area, confined by I-5 to the east and by residential, commercial, and light industrial developments to the west.

The segment of East Fork Hylebos Creek Tributary 0016A in the study area flows intermittently and meets the Federal Way Environmental Critical Areas Code classification as a Type F stream, meaning it has the potential to support fish. The streambed in this area is typically dry during late summer and early fall. Much of the stream is confined within a straight and uniform (ditch-like) channel profile. The gradient of the stream is low, generally 1 percent or less. As a result, fine sediments have accumulated in many areas, resulting in the shallowing and widening of the streambed. Dense patches of reed canarygrass have become established in some low-energy areas, exacerbating the deposition of fine sediment and covering any potential spawning gravels.

Riparian vegetation along East Fork Hylebos Creek Tributary 0016A in the study area includes cover types that provide a range of ecological functions. Areas dominated by native forest and wetlands are considered high-quality riparian habitat because they support functions such as fish and wildlife habitat provision; food chain support; water temperature moderation; infiltration; groundwater recharge and discharge; sediment delivery, transport, and storage; organic matter input; nutrient and pathogen removal; and stream channel formation and maintenance. In other areas, riparian habitat quality has been degraded through the conversion of native and structurally complex habitats into landscaping, mowed grasses, or invasive shrubs. From S 336th Street to S 344th Street, the stream flows approximately 0.5 mile through a corridor of native forest habitat that extends more than 100 feet from the stream in either direction.

West Fork Hylebos Creek Tributary 0014C

West Fork Hylebos Creek Tributary 0014C flows through the northwestern corner of the project limits of the South 336th Street Alternative near the intersection of SR 99 and S 336th Street. Surface-flowing segments near the stream's headwaters are in the mainline portion of the study area. The segment of West Fork Hylebos Creek Tributary 0014C in the study area has intermittent flow and is considered a Type F stream based on its potential to support fish.

The high level of development and associated impervious surfaces in the West Fork Hylebos Creek basin have resulted in severe flooding issues over the years and have contributed to increased peak and base flows in West Fork Hylebos Creek Tributary 0014C (King County 1990). As a result, Federal Way has completed numerous flood control projects, including large stormwater facilities throughout the basin.

Within the South 336th Street Alternative portion of the study area, West Fork Hylebos Creek Tributary 0014C flows through an in-line stormwater detention facility and wetland (WFW-02), entering from the north (under S 336th Street) and exiting to the west. Where it exits the wetland/stormwater facility, the stream flows through a raised outlet standpipe and then enters an approximately 500-foot-long culvert under SR 99, which has been identified as a total barrier to fish

passage (WDFW 2020). The stream lacks a defined bed and bank in this wetland area. While ponded, this facility could support fish use; however, once the facility drains, there is little or no holding water for fish. The pond's substrate is predominantly fine sediment and, as such, provides no suitable spawning habitat for anadromous or resident fish. Vegetation within the facility is dominated by native trees and shrubs that provide high-quality riparian habitat. Upstream and downstream of the detention facility, the stream is contained in pipes or in other in-line stormwater facilities.

The surface-flowing segment of West Fork Hylebos Creek Tributary 0014C in the mainline portion of the study area is associated with a stormwater facility in Belmor. In contrast to the segment in the South 336th Street Alternative portion of the study area, the stream's connection to the stormwater facility in Belmor is off-line rather than in-line, which means the stormwater facility has a connection to the stream, but the stream does not flow through the facility.

3.10.1.2 Vegetation, Wildlife, and Wildlife Habitat

Biologists identified and delineated 10 vegetation cover types in the study area and evaluated their relative habitat value. The cover types are commercial, residential, grassland, invasive brush, native brush, non-native forest, mature native forest, other native forest, wetland/stream, and stormwater pond. The relative habitat value of each cover type is based on habitat structure, scarcity in the study area, disturbance types and frequency, and time required for ecosystem functions to recover following clearing and site restoration. Detailed descriptions of the cover types can be found in the Appendix G3, Ecosystem Resources Technical Report.

Wildlife use of habitats in urban landscapes depends on the general location of the habitat, the size and type of undisturbed habitats, the degree of connectivity and extent of travel corridors between and among these habitats, and the types and levels of human activity.

Much of the study area is dominated by areas of high-intensity development with little vegetation cover and minimal habitat value. Trees and other landscaping in residential areas provide limited habitat value. Other common vegetation cover types, particularly in the rights-of-way of I-5 and other roads, are grassy areas and patches of invasive shrubs, such as Himalayan blackberry. The relative habitat value of all such areas is low to moderate.

Wildlife use of developed areas is generally limited to adaptable species, such as house sparrows, European starlings, rats, mice, raccoons, Virginia opossums, and eastern gray squirrels. Birds such as rock pigeons and cliff swallows commonly build nests on bridges and road overpasses, and many bat species use such structures as temporary roosting sites. Red-tailed hawks and other raptors prey on voles and other small mammals that are found in abundance in grassy vegetation, such as in the I-5 right-of-way. Open-water habitats, such as wetlands and stormwater detention ponds, provide resting and foraging areas for waterfowl. Animals that use habitats in the study area are exposed to high levels of disturbance generated by human activity in commercial, institutional, and industrial areas and by traffic on I-5 and major arterial roadways.

Structurally complex habitats, such as forested areas and wetlands, have more biological diversity and higher value as wildlife habitat. With habitat features such as large trees, snags, decaying logs, and a diverse understory, areas classified as mature native forest typically support diverse communities of forest-associated wildlife. Mature native forests have been identified as priority habitats by WDFW. Most patches of forest cover in the study area are fragmented and separated from surrounding habitat areas by commercial and residential developments and roads. Despite their isolation, these areas still provide habitat for forest-associated resident and migratory songbirds, as well as for hawks, owls, woodpeckers, and small mammals. The largest patches of forested habitat are near the South 336th Street and South 344th Street alternatives. These areas contain the only

patches of mature native forest that have been identified in the study area. One patch, approximately 10 acres in size, parallels I-5 south of S 336th Street.

The Migratory Bird Treaty Act of 1918, administered by the U.S. Fish and Wildlife Service, makes it unlawful to take any migratory bird, or the parts, nests, or eggs of any such bird, except under the terms of a valid permit. In the context of this Act, "take" is defined as "pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill" (16 U.S. Code § 715n). Nearly all bird species that may occur in the study area are protected under the Migratory Bird Treaty Act. Protected birds or bird nests may be present in any of the cover types in the study area. Forested areas, wetlands, and other areas with comparatively complex cover types are likely to support greater densities and more diverse assemblages of nesting birds.

3.10.1.3 Wetlands

Sound Transit identified a total of 21 wetlands in the study area. During scoping, agencies, tribes, and the public expressed concern about potential impacts on ecosystem resources in these areas. While formal delineations are not typically required at this stage of the environmental review process, Sound Transit determined that detailed information collected early in the process would help the design team avoid or minimize impacts on wetlands. Therefore, biologists performed formal delineations of wetland boundaries in legally accessible areas associated with tributaries of Hylebos Creek. Most wetlands in the study area are associated with tributaries of Hylebos Creek and, as a result, most wetlands in the study area were delineated. Wetlands that could not be accessed for formal delineations were mapped and characterized at the reconnaissance level. Most of the identified wetlands are associated with streams and are considered either riverine or depressional wetlands.

All wetlands were rated according to local jurisdiction critical area ordinances and the Washington State Wetland Rating System for Western Washington, 2014 Update (Hruby 2014), which differentiates between wetlands based on characteristics such as sensitivity to disturbance, rarity in the landscape, functions they provide, and ability to replace them. The wetland rating system assigns wetlands a Category I through IV by evaluating the following parameters: water quality, hydrologic function, and habitat function. Biologists identified the regulatory buffer for each wetland based on its rating and habitat function score. Habitat function scores, which range from 3 to 9, are determined based on habitat complexity and benefits to wildlife. Descriptions of individual wetlands are provided in Appendix G3, Ecosystem Resources Technical Report.

Throughout much of the study area, industrial, institutional, commercial, and residential development has substantially altered natural wetlands and watercourses, and buffers are degraded due to development, human disturbance, and abundant non-native and invasive vegetation. In many areas, the vegetated buffers of wetlands are limited by roads, buildings, parking lots, and other impervious surfaces. In residential areas, many buffers include landscaped lawns and other maintained areas. Where wetland buffers overlap stream buffers, the buffers are often less constrained and include riparian vegetation, such as mixed deciduous/coniferous forests.

At the Midway Landfill Alternative, biologists identified five areas meeting the parameters for wetland hydrology, soils, and vegetation. However, the U.S. Army Corps of Engineers determined that the areas do not meet federal criteria for jurisdictional wetlands (Tong 2019), and Ecology verified that they are non-jurisdictional under state definitions (Gresham 2020). As such, these areas located within the bounds of the former Midway Landfill are not regulated wetlands and are not discussed further. One wetland, previously delineated for the WSDOT SR 509 Project, was identified in the Midway Landfill Alternative portion of the study area north of the proposed OMF South site.

The portion of the study area encompassing the South 336th Street and South 344th Street alternatives is dominated by commercial, institutional, and industrial development, although there is an approximately 100- to 300-foot-wide undeveloped corridor adjacent to I-5. Ten wetlands were identified in this portion of the study area. All but one of these are associated with East Hylebos Creek Tributary 0016A; the remaining wetland, a Category II forested wetland identified as Wetland WFW-02, is contained within the in-line stormwater detention facility associated with West Fork Hylebos Creek Tributary 0014C. Four of the wetlands in this portion of the study area are Category II, five are Category III, and one is Category IV. Habitat scores of the Category II and Category III wetlands range from 4 to 6, based on the state wetland rating form. The Category IV wetland has a habitat score of 3.

Ten wetlands were identified within the mainline portion of the study area. Most of these are riverine wetlands associated with East Fork Hylebos Creek Tributary 0016A and are in areas that were disturbed by residential development and the construction of I-5. Seven of these wetlands are Category III wetlands, with habitat scores ranging from 3 to 5. The other three are Category IV wetlands, with habitat scores of 3 and 4, based upon the state wetland rating form.

3.10.1.4 Threatened and Endangered Species

As discussed in Section 3.10.1.2, no ESA-listed fish are known or expected to be present in the study area under current conditions. In addition, the Washington Department of Natural Resources Natural Heritage Program database does not include any records of ESA-listed plant populations within 5 miles of the study area (WDNR 2019).

According to the U.S. Fish and Wildlife Service Information for Planning and Consultation planning tool, three ESA-listed wildlife species (marbled murrelets, yellow-billed cuckoos, and streaked horned larks) and two species proposed for listing (gray wolves and North American wolverines) potentially occur in areas that might be affected by the project (USFWS 2020). However, none of these species are expected to occur in the study area because no suitable habitat is present (see Appendix G3, Ecosystem Resources Technical Report). No designated critical habitat for any ESA-listed species is present in the study area.

3.10.2 Environmental Impacts

For this analysis, the design team identified a permanent impact footprint for each alternative, based on project features that could result in long-term impacts on ecosystem resources. Each build alternative footprint includes the OMF South site, along with the short segments of lead tracks that connect the site to the mainline and any new mainline that would be constructed to connect the site to the southern terminus of FWLE.

The design team also defined a larger construction footprint for each build alternative, encompassing the permanent impact footprint and surrounding areas where vegetation clearing and ground-disturbing work would likely be required for project construction. Areas outside the permanent impact footprint but within the construction footprint would be expected to be restored to pre-project conditions, or better, following construction. These footprints were overlaid on mapped locations of wetlands, streams, buffers, and vegetation cover types to determine the extent of the potential impacts of the alternatives on ecosystem resources.

Compared to the impacts of site facilities and at-grade tracks, the impacts of elevated portions of the mainline, lead tracks, and tail tracks would be less severe. These structures would be relatively narrow (typically 20 to 30 feet wide) and generally more than 15 feet above the ground surface. Vegetation would be able to grow in such areas, although the density and variety of vegetation

would be limited by the reduced availability of sunlight and water. For operational safety, only appropriate vegetation would be planted under the elevated mainline. Trees and other tall vegetation would not be allowed to grow underneath or within 15 feet of elevated track segments.

The tables and figures in Appendix G3, Ecosystem Resources Technical Report, detail the results of the impact analysis. The permanent and construction footprints developed for this analysis represent Sound Transit's best estimates of the areas that may be affected by the OMF South alternatives. These estimates are conservative. For example, clearing of all areas within the construction footprint may not be necessary, but analyses of construction-related impacts are based on the assumption that the entire construction footprint would be cleared. In addition, the permanent impact footprint may include some areas where project components could be scaled down or eliminated as the project design progresses from its current, preliminary status. Moreover, not all areas within the project footprint would be converted to structures or hard surfaces. Some vegetated areas are expected to be converted to other land cover types, such as landscaping or stormwater facilities; in other areas, existing hard surfaces may be converted to vegetation. Section 3.11, Water Resources, includes more analysis on land cover conversions.

By applying a consistent set of assumptions for all the alternatives, these footprints allow Sound Transit to evaluate the relative degree of the potential impacts of the alternatives on ecosystem resources. Actual anticipated impacts would be determined when an alternative is selected to be built and the project design is sufficiently advanced to undergo permitting review. Additional field work would be conducted for the selected alternative to refine the understanding of project impacts.

Analyses of project-related impacts assume that appropriate BMPs would be implemented and would perform as expected to avoid and minimize certain impacts during construction. For each resource area, analyses of direct impacts are divided between long-term (operational) impacts and short-term (construction-related) impacts. Cumulative impacts are evaluated in Chapter 4.

3.10.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to ecosystem resources from construction or operation of OMF South would not occur. FWLE will temporarily impact a wetland buffer within the Midway Landfill Alternative study area. However, the overall impact to ecosystem resources will be minimal. Other planned projects in the area could have impacts to ecosystem resources, depending on their design. Because TDLE would open after OMF South, impacts associated with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

3.10.2.2 Long-Term Impacts

Under any of the build alternatives, direct long-term impacts on ecosystem resources would occur where permanent features, such as project facilities, overlap ecosystem components, such as wetlands, wetland buffers, streams, stream buffers, or native forest. Long-term impacts of OMF South development on ecosystem resources are described below. For each ecosystem component, the impacts common to all alternatives are described first, followed by comparisons of the effects of the alternatives.

Aquatic Species and Habitat

Direct impacts on aquatic resources would occur where permanent features alter in-stream habitat or riparian functions. As discussed in Section 3.10.1.2, no ESA-listed fish are known or

expected to be present in the study area. The study area contains no critical habitat for ESA-listed species; therefore, none of the OMF South alternatives would have the potential for any adverse effects on ESA-listed species or critical habitat.

Sound Transit has committed to minimizing the need for streams to be enclosed in new pipes or culverts and has designed the OMF South alternatives to avoid piping any stream channels. The only site where a new culvert might be needed is at a location under consideration for an emergency vehicle access route to the mainline under the South 344th Street Alternative, as discussed below. If any existing culverts must be replaced to accommodate project facilities, they would be designed and installed in accordance with WDFW's Water Crossing Design Guidelines (Barnard et al. 2013). Any work below the ordinary high water line of any streams in the study area would be conducted in accordance with the terms of the Hydraulic Project Approval and other applicable permits and reviews.

None of the stream segments in the study area are known or expected to support fish use under current conditions. Nevertheless, the loss or degradation of stream habitat could reduce the availability of prey (e.g., benthic invertebrates) for fish and other aquatic species in downstream reaches. Impacts on stream habitat could also decrease the availability and quality of fish habitat in the future if access is restored through the removal of downstream fish passage barriers.

Additional impacts may occur where elevated mainline or lead tracks pass over surface-flowing streams. Shade from structures placed over streams may affect the behavior of fish in the affected stream segments. Juvenile fish may respond to shadows from overwater structures by pausing at the upstream end of the darkened area or moving into deeper waters, potentially increasing their vulnerability to predation (Kemp and Williams 2008; Moore et al. 2013). Although none of the stream segments in the study area currently support fish, the presence of these structures could affect fish behavior if access is restored in the future.

Where the permanent impact footprint of an OMF South alternative overlaps a stream's riparian buffer, the ecological function of that buffer would be diminished or lost. Substantial decreases in current riparian function would occur where areas of tree or shrub cover in a stream's riparian zone are converted to facilities or to other vegetation types (e.g., lawns, ornamental landscaping) with less structural or compositional diversity. Where riparian vegetation is removed altogether, potential future riparian functions would be eliminated. Potentially affected riparian functions and processes include fish and wildlife habitat provision; food chain support; water temperature maintenance; infiltration; groundwater recharge and discharge; sediment delivery, transport, and storage; organic matter input; nutrient and pathogen removal; and stream channel formation and maintenance. Impact areas and length of streams affected are summarized in Table 3.10-1 and depicted in Figures G3.4-1 through G3.4-5 in Appendix G3, Ecosystem Resources Technical Report.

Impact values in Table 3.10-1 are broken into three categories or types of impact: proximity, relocation, and constriction. Proximity impacts are those that would occur where project features (including elevated structures, such as the mainline and lead tracks) are built near, parallel to, or over a stream. Relocation impacts would occur where an existing stream channel would be relocated and realigned to accommodate project features. Relocated stream segments would be designed to include meanders and other features that would enhance the availability and diversity of aquatic habitats over the long term. Constriction impacts would occur only under the South 336th Street Alternative, where a fill slope would be extended into a wetland/stream lacking a defined stream channel. These impacts are described further in the discussion of the impacts of that alternative.

Table 3.10-1 Potential Long-Term Impacts on Aquatic Resources

Alternative	Mainline Option	Project Element	Stream[1]	Stream Impact (linear feet, type)[2]	Stream Channel Daylighted (linear feet)	Stream Buffer Impact (acres)[3]
Midway Landfill	N/A	OMF Site	N/A	0	0	0
South 336th Street	TDLE Preferred Alternative	OMF Site	East Fork Hylebos Creek Tributary 0016A	800 – relocation	0	3.3
			West Fork Hylebos Creek Tributary 0014C[4]	600 – constriction	0	2.6
		Mainline[5]	East Fork Hylebos Creek Tributary 0016A	800 – relocation 900 – proximity	0	4.4
	TDLE Design Option	OMF Site	East Fork Hylebos Creek Tributary 0016A	800 – relocation	0	3.3
			West Fork Hylebos Creek Tributary 0014C[4]	600 – constriction	0	2.6
		Mainline[5]	East Fork Hylebos Creek Tributary 0016A	800 – relocation 1,000 – proximity	0	5.0
South 344th Street	TDLE Preferred Alternative and Enchanted Parkway tail track alignment	OMF Site	East Fork Hylebos Creek Tributary 0016A	1,200 – relocation	800	5.4
		Mainline[5]		1,600 – relocation	0	6.4
	TDLE Design Option and I-5 tail track alignment	OMF Site	East Fork Hylebos Creek Tributary 0016A	1,200 – relocation	800	5.4
		Mainline[5]		1,600 – relocation 100 – proximity	0	7.7
	TDLE Design Option and Enchanted Parkway tail track alignment	OMF Site	East Fork Hylebos Creek Tributary 0016A	1,200 – relocation	800	5.4
		Mainline[5]		1,600 – relocation 100 – proximity	0	6.9
	TDLE Preferred Alternative and I-5 tail track alignment	OMF Site	East Fork Hylebos Creek Tributary 0016A	1,200 – relocation	800	5.4
		Mainline[5]		1,600 – relocation	0	7.1

Notes:

(1) Both affected streams are Type F, per WAC 222-16-030.

(2) Includes the total length of surface-flowing stream within the permanent impact footprint defined for this analysis. Impact types: proximity = mainline or other structures near, parallel to, or over stream; relocation = stream channel realigned to accommodate project features; constriction = extension of fill slope into wetland area where stream lacks a defined channel.

(3) Values presented in this table represent all affected areas inside functional stream buffers, including areas that overlap with wetland buffers.

(4) The portion of this stream in the study area lacks a defined bed and bank where it flows through Wetland WFW-02. For this reason, stream impacts are based on the approximate centerline of the mapped stream, and buffer impacts are based on the affected area of Wetland WFW-02. See text for further discussion.

(5) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

None of the alternatives would be expected to have long-term adverse effects on water quality or flow regimes in streams. All areas of pollution-generating impervious surface created or replaced for project construction — including many areas where stormwater runoff currently is not detained or treated — would be fully detained and treated using underground vaults in accordance with applicable standards. Peak stream flows would not increase because the stormwater systems built for the proposed project would be designed to simulate predevelopment hydrology. Additional measures to reduce stormwater runoff, such as low-impact development (LID) or other on-site measures, would be considered at a more advanced phase of project development.

Other stormwater systems, such as stormwater ponds or a combination of vaults and ponds, may also be considered during future design phases. Construction of stormwater ponds could result in additional impacts on streams. For example, if ponds are located in vegetated stream buffers, pond construction could result in the temporary or permanent degradation of riparian habitat. Also, the siting needs for stormwater ponds could affect the locations of reconfigured stream channels.

Operation of the mainline would not be expected to increase nighttime illumination of fish-bearing waters (which could increase the risk of predation on juvenile salmonids). The tracks would have no overhead lighting, and the train headlights would be directed parallel to the tracks. Lighting within the site would be shielded and directed inward toward the site to minimize spillover effects.

Midway Landfill Alternative

The Midway Landfill Alternative would have no direct impact on streams or stream channels. No streams are present on the Midway Landfill Alternative site. The only project features affecting streams under this alternative relate to stormwater runoff and detention.

Compared with the other alternatives, the Midway Landfill Alternative would convert more pervious land cover to impervious land cover. However, all stormwater runoff from the site would be detained and treated in an underground vault system that would be designed in accordance with the city of Kent Stormwater Manual. The treatment vaults in turn would likely discharge to the on-site regional stormwater treatment and detention facility, which ultimately discharges to the North Fork McSorley Creek approximately 1.1 miles west. As a result, an increase in the area of impervious surface under this alternative would not be expected to adversely affect fish resources, stream hydrology, or aquatic habitat.

South 336th Street Alternative

The South 336th Street Alternative would affect approximately 3,100 to 3,200 linear feet of surface-flowing stream — 2,500 to 2,600 linear feet of East Fork Hylebos Creek Tributary 0016A (depending on whether the TDLE Preferred Alternative or Design Option is selected; see below) and approximately 600 linear feet of West Fork Hylebos Creek Tributary 0014C (Table 3.10-1). As a result, this alternative would have a greater impact on aquatic habitats than either the Midway Landfill Alternative or the South 344th Street Alternative. Compared to the South 344th Street Alternative, the South 336th Street Alternative would affect approximately 300 fewer linear feet of East Fork Hylebos Creek Tributary 0016A. That difference would be offset, however, by this alternative's impacts on West Fork Hylebos Creek Tributary 0014C, which would be avoided by the South 344th Street Alternative. The South 336th Street Alternative would also relocate less of East Fork Hylebos Creek Tributary 0016A and would not involve any stream daylighting. These impacts are analyzed below.

Approximately 2,600 linear feet of East Fork Hylebos Creek Tributary 0016A (surface-flowing) fall within the permanent impact footprint of this alternative. The affected portion of the stream extends

from north of S 336th Street to the point where the stream currently enters a culvert upstream of the WSDOT stormwater facility, approximately 600 feet north of S 344th Street (see Figure G3.4-4 in Appendix G3, Ecosystems Resources Technical Report). Approximately 1,600 feet of the stream channel in this area would be relocated and realigned to include meanders and other features that enhance the availability and diversity of aquatic habitats. Approximately 800 feet of the stream relocation would occur in the site footprint, and approximately 800 feet would be associated with the mainline. The amount of the stream that is contained in pipes would not change. An additional 900 to 1,000 linear feet of the stream would be affected by proximity impacts, depending on the design option for the curve at the northern end of the mainline (Table 3.10-1).

Currently, East Fork Hylebos Creek Tributary 0016A in this area is partially confined within a straight and narrow channel that lacks complexity; therefore, relocating and realigning the channel could benefit the stream by adding channel sinuosity and habitat complexity. Conversely, changing the physical characteristics of a stream could affect its hydrology and downstream sediment regimes. The impacts are considered permanent because the site would not be returned to its previous location. The new channel would be designed to maintain flows and water quality conditions. In addition, substrate and bank conditions in the realigned channel would be improved from existing conditions. On the other hand, the presence of support columns near the stream may constrain options for natural or human-created modifications to channel configuration in the future.

Nearly all of the existing forested riparian habitat along the affected stretch of stream would be cleared for construction, and trees would not be allowed to grow back within 15 feet of the mainline and associated facilities. Replacement of mature, mixed deciduous and coniferous forest with project features and non-forested vegetation would permanently reduce the capacity of this area to support riparian functions. The extent to which it would be possible to replant disturbed areas with trees will not be known until the project design has been advanced further. It is assumed for this analysis that replanting with trees would not be possible between the mainline and the OMF site. Some riparian habitat functions would be restored through revegetation with native shrubs and other low-growing species.

The South 336th Street Alternative would also affect aquatic and riparian habitats associated with West Fork Hylebos Creek Tributary 0014C. The impacts on aquatic habitats are difficult to quantify because the stream lacks a defined channel where it flows through Wetland WFW-02, which serves as an in-line stormwater detention facility south of S 336th Street. For this reason, the estimated extent of project-related impacts is based on the linework obtained from the King County iMap interactive mapping tool. That source identifies approximately 600 linear feet of the stream that would fall within the permanent impact footprint of the South 336th Street Alternative. The amount of the stream that is contained in pipes would not change. As discussed in the analysis of impacts on wetlands (see below), the expansion of the fill slope into Wetland WFW-02 would constrict the flow path of the stream where it flows through the wetland. This constriction could reduce the storage capacity of that wetland/stormwater facility, potentially increasing the magnitude and duration of peak flow events in West Fork Hylebos Creek Tributary 0014C (see also Section 3.11, Water Resources).

Vegetation in and around Wetland WFW-02 supports riparian functions for West Fork Hylebos Creek Tributary 0014C. The wetland and its buffer are dominated by mature forest that provides high-quality riparian habitat. Clearing of these areas for project construction would reduce their capacity to support riparian functions. If the eastern portion of the wetland is converted to a fill slope, that slope may be replanted with trees and other vegetation that supports many riparian functions. Given the uncertainty about the future riparian functions of vegetation on the fill slope, these impacts — which are identified for this analysis as the extent of permanent impacts on Wetland WFW-02 — are considered permanent.

The TDLE Design Option at the northern end of the mainline would affect approximately 100 linear feet more of East Fork Hylebos Creek Tributary 0016A than would the TDLE Preferred Alternative (Table 3.10-1). While the TDLE Design Option would intersect the northern end of the stream in Belmor, the TDLE Preferred Alternative would avoid it altogether.

South 344th Street Alternative

The South 344th Street Alternative would affect approximately 2,800 to 2,900 linear feet of surface-flowing stream (Table 3.10-1). In contrast to the South 336th Street Alternative, nearly all impacts would result from relocating East Fork Hylebos Creek Tributary 0016A. Only 100 linear feet of that stream would be affected by proximity impacts (under the TDLE design option for the curve at the northern end of the mainline) and impacts on West Fork Hylebos Creek Tributary 0014C would be avoided altogether.

Between S 336th Street and the culvert upstream of the WSDOT stormwater facility, the entire surface-flowing segment of East Fork Hylebos Creek Tributary 0016A (approximately 2,100 linear feet) would be relocated (see Figures G3.4-5 and G3.4-6 in Appendix G3, Ecosystems Resources Technical Report). An additional 700 linear feet of streambed south of S 344th Street would also be relocated. The impacts of stream relocation and realignment would be similar to those described for the South 336th Street Alternative, but they would extend over a greater distance.

In total, approximately 1,200 feet of the stream realignment would occur in the site footprint, and approximately 1,600 feet would be associated with the mainline (Table 3.10-1).

Similar to the South 336th Street Alternative, the loss of mature, mixed deciduous and coniferous forest would reduce the riparian functions along the affected stream reaches. By affecting reaches downstream of S 344th Street, this alternative would degrade riparian habitat along 700 more feet of the stream than would the South 336th Street Alternative.

Under this alternative, to accommodate the relocation of an existing WSDOT stormwater pond, approximately 800 feet of East Fork Hylebos Creek Tributary 0016A immediately north of S 344th Street would be removed from existing culverts and restored to a surface-flowing channel. Daylighting this segment would remove an existing barrier to fish passage and would increase the amount of functioning aquatic and riparian habitat available in the stream system.

Emergency vehicle access to the mainline would be needed in the daylighted stream location. One of the options under consideration may require approximately 60 feet of channel that is currently culverted (and that would otherwise be daylighted, as described above) to be placed in a new culvert. That new culvert would use the stream simulation methodology outlined in WDFW's Water Crossing Design Guidelines (Barnard et al. 2013). It may be possible to eliminate the need for a culvert through detailed design of the access and of the stream meanders. The design of the emergency vehicle access would need to be coordinated and approved by Sound Transit, WSDOT, and Federal Way.

As with the South 336th Street Alternative, the TDLE Design Option at the northern end of the mainline would affect slightly more of East Fork Hylebos Creek Tributary 0016A than would the TDLE Preferred Alternative. The direct permanent impacts of the tail track design options on streams would be largely identical. The I-5 alignment would affect more stream/wetland buffer along East Fork Hylebos Creek Tributary 0016A than would the Enchanted Parkway alignment.

Vegetation, Wildlife, and Wildlife Habitat

Long-term impacts on vegetation and wildlife habitat would vary, depending on the affected land cover type. Land cover types include both vegetated areas (e.g., forest, grassland) and developed areas (e.g., commercial, residential). In much of the study area, the replacement of existing impervious surfaces and structures would constitute a minimal change in ecological functions, such as the capacity to support wildlife. The surrounding grass and low-growing vegetation along the alignment would provide some habitat for ground-dwelling small mammals, such as mice and voles.

The severity of impacts on plants and animals would be greater where cover types dominated by native forest — mature native forest in particular — are affected. Removing trees, snags, and understory vegetation would eliminate nesting and foraging sites for birds (including migratory birds), roosting sites for bats, and hiding cover for small mammals. Similarly, impacts on the wetland/stream cover type would have an elevated potential for adverse effects on plants and animals, based on the presence of water and diverse plant communities in many such areas. Alternatives that affect a greater area of these habitat types would have a higher likelihood of adverse effects on vegetation and wildlife. Table 3.10-2 presents a comparison of the build alternatives' potential impacts on vegetation in the study area, based on the amount of each land cover type in the permanent impact footprint.

Table 3.10-2 Potential Long-Term Impacts on Vegetation

Alternative	Design Option	Land Cover Type[1]									
		Commercial	Residential	Grassland	Invasive Brush	Non-native Forest	Mature Native Forest	Other Native Forest	Stream/ Wetland	Stormwater Pond	Total
OMF Site Impacts (acres)											
Midway Landfill	N/A	9	1	57	1	1	0	4	0	5	**78**
South 336th Street	N/A	37	4	4	3	1	12	3	5	1	**70**
South 344th Street	N/A	38	7	4	5	<0.5	6	6	2	2	**70**
Mainline Impacts[2] (acres)											
Midway Landfill	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
South 336th Street	TDLE Preferred Alternative	2	7	<0.5	<0.5	0	3	3	2	0	**17**
	TDLE Design Option	2	7	1	<0.5	0	3	3	2	0	**18**
South 344th Street	TDLE Preferred Alternative and Enchanted Parkway tail track alignment	5	6	<0.5	2	0	4	5	2	1	**25**
	TDLE Design Option and I-5 tail track alignment	4	7	1	2	0	4	6	2	1	**27**
	TDLE Design Option and Enchanted Parkway tail track alignment	5	7	1	2	0	4	5	2	1	**27**
	TDLE Preferred Alternative and I-5 tail track alignment	5	6	<0.5	2	0	4	6	2	1	**26**

Notes:

(1) Land cover types are described in Appendix G3, Ecosystem Resources Technical Report.

(2) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

The severity of impacts would also depend on the type of structure. Construction of the OMF site and at-grade segments of mainline would mean the permanent removal of nearly all vegetation within the permanent impact footprint. In contrast, some vegetation would be able to grow underneath elevated structures, although the vegetation would be limited by the reduced availability of sunlight and water.

Operation of OMF South would entail moderate to high levels of human activity and associated noise and light. Notably, all three build alternatives are adjacent to I-5 and are in developed areas with relatively high levels of human activity. In addition to the noise, light, and vehicle traffic on the highway, regular human activity associated with residential, commercial, institutional, and industrial development is a common feature of the landscape throughout the study area. Wildlife that uses habitats in or near the build alternatives is regularly exposed to human activity, noise, and light.

If activity or noise levels at the maintenance facility noticeably exceed current conditions, affected animals may be displaced from otherwise suitable habitat, potentially leading to competition with animals that occupy suitable habitat at other sites with less disturbance. Such competition may produce increased stress and decreased reproductive success for affected individuals. Adverse behavioral responses to increased night lighting may have similar consequences. Animals displaced from areas of suitable habitat may be exposed to an elevated risk of predation or vehicle collisions while they are seeking new areas of suitable habitat.

Based on the limited amount of suitable habitat that would be affected under any of the alternatives, the project would not be expected to measurably reduce the regional populations of any wildlife species. None of the build alternatives are within 0.25 mile of a known breeding area or other sensitive site for any wildlife species of concern.

As discussed in Section 3.10.1.2, no ESA-listed plant or wildlife species are known or expected to be present in the study area, and the study area contains no critical habitat for ESA-listed species. As such, none of the OMF South alternatives would have the potential for any adverse effects on ESA-listed species or critical habitat.

Midway Landfill Alternative

Compared with the other build alternatives, the Midway Landfill Alternative would have minimal effects on native or complex habitats (i.e., the mature native forest, native forest, and wetland/stream cover types). Most of the permanently affected area consists of the grassland cover type, which supports limited habitat functions that are widely available elsewhere in the study area. Only about 4 acres of other native forest cover would be affected, and no mature native forest or wetland/stream would be affected (Table 3.10-2).

OMF South operations at the Midway Landfill site would result in a greater increase in human activity and associated noise and light compared with the other build alternatives. This is because most of the site is currently fenced to limit access to the landfill. In contrast, the South 336th Street and South 344th Street alternative sites are surrounded by commercial and residential areas with relatively high levels of human activity. Compared to the other two alternatives, however, the Midway Landfill Alternative would have a lower potential for adverse effects on wildlife because it would affect fewer acres of structurally complex habitat types such as native forests and wetlands.

South 336th Street Alternative

The extent of this alternative's effects on the mature native forest, other native forest, and wetland/stream cover types would be greater than the Midway Landfill Alternative and approximately equal to the South 344th Street Alternative. Under this alternative (with either

mainline design option), construction and operation of the facility and mainline would result in permanent impacts on approximately 15 acres of mature native forest, 6 acres of other native forest, and 7 acres of the wetland/stream cover type (Table 3.10-2). Most impacts (12 of 15 acres) on the mature native forest cover type would be associated with the OMF site rather than the mainline. Approximately 5 acres of mature native forest habitat surrounding Wetland WFW-02 would fall within the permanent impact area of the facility, as would approximately 7 acres of this habitat type along the eastern edge of the facility.

Compared with the South 344th Street Alternative, the South 336th Street Alternative would affect less of the forested wetland and riparian habitats associated with East Fork Hylebos Creek Tributary 0016A. The TDLE Design Option at the northern end of the mainline would not have a noticeably different effect on native forests or wetlands and streams as compared to the TDLE Preferred Alternative (Table 3.10-2).

Based on the prevalence of the commercial and residential cover types on the existing site and in the surrounding study area, OMF South operations at the South 336th Street Alternative site would probably result in a less noticeable increase in human activity and associated noise and light compared with the Midway Landfill Alternative. By affecting more areas with the native forest and wetland/stream cover types, however, this alternative would likely degrade or eliminate more areas that currently provide resting cover, hiding cover, or travel corridors for wildlife. As such, the potential for long-term behavioral disruption or displacement from suitable habitats may be greater under this alternative than under the Midway Landfill or South 344th Street alternatives.

South 344th Street Alternative

The extent of the South 344th Street Alternative's effects on the native forest and wetland/stream cover types would be similar to but lower than that of the South 336th Street Alternative (Table 3.10-2). Differences between these two alternatives arise primarily from the exclusion of Wetland WFW-02 and surrounding forested areas from the impact area of the South 344th Street Alternative. Compared to the South 336th Street Alternative, this alternative would affect fewer acres of the mature native forest (10 acres, compared to 15) and wetland/stream (4 acres, compared to 7) cover types. This alternative would affect 5 to 6 more acres of other native forest than the South 336th Street Alternative, depending on the tail track design option. Similar to the South 336th Street Alternative, most of the impacts on mature native forest would be associated with the OMF site, not the mainline.

The impacts of the TDLE Design Option at the northern end of the mainline would be essentially identical to those of the TDLE Preferred Alternative (Table 3.10-2). At the southern end of the facility, the design options for the tail tracks would have essentially identical impacts on the mature native forest and wetland/stream cover types, while the I-5 alignment would have slightly more impacts on other native forest, compared to the Enchanted Parkway alignment (Table 3.10-2).

Based on the smaller extent of impacts on the native forest and wetland/ stream cover types (and the similar degree of existing development in the study area), this alternative would likely have a lower potential to disturb wildlife over the long term compared with the South 336th Street Alternative, but greater than the Midway Landfill Alternative.

Wetlands

Filling, excavating, or clearing within wetlands or wetland buffers would diminish wetland functions through the loss of area, changes to surface or subsurface water flows, or long-term changes to vegetation. Project actions that may entail such impacts include construction of buildings, roadways, mainline or lead tracks (including support columns), train storage areas, retaining walls,

parking areas, and stormwater facilities. Wetland impact areas are summarized in Table 3.10-3 below and depicted in Figures G3.4-1 through G3.4-5 in Appendix G3, Ecosystem Resources Technical Report. Wetland buffer impacts are summarized in Table 3.10-4 below.

Not all wetlands underneath elevated structures, such as the lead tracks and the mainline, would be permanently filled. However, trees and other tall vegetation would not be allowed to grow underneath or within 15 feet of elevated track segments. This would result in the permanent conversion from trees and tall shrubs to short-statured shrubs and herbaceous vegetation. In addition, the long-term presence of structures above vegetation would reduce the amount of sunlight and precipitation the plants receive, potentially making these areas more sparsely vegetated. Also, the interception of precipitation by overhead structures would have the potential for long-term impacts on wetland hydrology. For any given wetland, the severity of those impacts would depend on the proportion of the wetland that is affected as well as the extent to which precipitation contributes to wetland hydrology at that site.

Table 3.10-3 Potential Long-Term Impacts on Wetlands

Wetland Rating[1]	Alternative		
	Midway Landfill	South 336th Street[2]	South 344th Street[2,3]
OMF Site Impacts (acres)			
Category II Wetlands	0	3.5	0.9
Category III Wetlands	0	<0.05	0.5
Total OMF Site Impacts	*0*	*3.5*	*1.4*
Mainline Impacts[4] (acres)			
Category II Wetlands	N/A	0.8	1.0
Category III Wetlands	N/A	0.6	0.4
Total Mainline Impacts	*N/A*	*1.4*	*1.5*
Total Impacts	***N/A***	***4.9***	***2.9***

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities.

(2) The impacts of the design options for the curve at the northern end of the mainline would differ by less than 0.05 acre.

(3) The impacts of the design options for the mainline, including the tail tracks, for the South 344th Street Alternative would range from 2.8 to 2.9 acres; see Table 3.10-6 for details.

(4) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Table 3.10-4 Potential Long-Term Wetland Buffer Impacts

Alternative/Mainline Design Option		Wetland Buffer Impacts (acres)[1,2]	Affected Wetland Buffers
OMF Site Impacts[3]			
Midway Landfill		0	N/A
South 336th Street		7.7	WFW-01, WFW-02, WFW-03, WFW-06, WFW-14, WFW-15
South 344th Street		6.6	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-17, WFW-18
Mainline Impacts[4]			
Midway Landfill	N/A	N/A	N/A
South 336th Street	With TDLE Preferred Alternative	4.0	WFW-01, WFW-03, WFW-04, WFW-06, WFW-11, WFW-13, WFW-15
	With TDLE Design Option	4.5	WFW-01, WFW-03, WFW-04, WFW-06, WFW-07, WFW-11, WFW-13, WFW-15
South 344th Street	With TDLE Preferred Alternative and Enchanted Parkway tail track alignment	6.1	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-11, WFW-13, WFW-15, WFW-17
	With TDLE Design Option and I-5 tail track alignment	6.9	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-07, WFW-11, WFW-13, WFW-15, WFW-17, WFW-21
	With TDLE Design Option and Enchanted Parkway tail track alignment	6.6	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-07, WFW-11, WFW-13, WFW-15, WFW-17
	With TDLE Preferred Alternative and I-5 tail track alignment	6.5	WFW-01, WFW-03, WFW-04, WFW-05, WFW-06, WFW-11, WFW-13, WFW-15, WFW-17, WFW-21

Notes:

(1) Values presented in this table represent all affected areas inside functional wetland buffers, including areas that overlap with stream area and stream buffers.

(2) Values in this table likely overestimate the extent of buffer impact areas. These values include all areas within wetland buffers, including the buffers of wetlands that may be permanently eliminated by project construction. If a wetland is eliminated, the surrounding area no longer serves as a wetland buffer, and impacts on that surrounding area do not constitute wetland buffer impacts. If one of the build alternatives is selected, actual buffer impacts would be determined through the permitting process.

(3) The design options for the curve at the northern end of the mainline and for the tail tracks do not influence the impact footprint of the OMF sites; therefore, only one set of impact values is presented for each OMF site.

(4) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Midway Landfill Alternative

The Midway Landfill Alternative would have no long-term impacts on wetlands because there are no regulated wetlands or wetland buffers within the temporary or permanent impact footprints of this alternative (see Section 3.10.1.1).

South 336th Street Alternative

The South 336th Street Alternative would have the greatest extent of long-term impacts on wetlands and wetland buffers among the build alternatives (Tables 3.10-3 and 3.10-4). Almost 90 percent of the area of permanent impacts on wetlands under this alternative would occur during construction of the OMF site. The largest proportion of the total wetland impact area (2.6 acres of 4.9 acres total) would occur in Wetland WFW-02, a Category II forested wetland that is associated with West Fork Hylebos Creek Tributary 0014C and contained within a stormwater facility in the northwestern portion of the OMF site footprint (Table 3.10-5; also see Figure G3.4-4

in Appendix G3, Ecosystem Resources Technical Report). The preliminary facility design in this area shows a fill slope extending into the eastern portion of the wetland and a retaining wall along the northern edge. The fill slope would have a slope ratio of 3:1 (i.e., 1 foot of vertical difference for every 3 horizontal feet) and would be able to support trees and other vegetation that provide substantial ecological functions in the wetland buffer. Sound Transit is exploring options to further avoid and minimize impacts on wetlands during the design development process, if feasible.

Table 3.10-5 Potential Long-Term Impacts of the South 336th Street Alternative on Wetlands

Wetland ID[1]	TDLE Preferred Alternative	TDLE Design Option
OMF Site Impacts (acres)[2]		
Category II Wetlands		
WFW-01	0.9	
WFW-02	2.6	
Category II Subtotal	*3.5*	
Category III Wetlands		
WFW-15	<0.05	
Category III Subtotal	*<0.05*	
Total OMF Site Impacts	**3.5**	
Mainline Impacts[3] (acres)		
Category II Wetlands		
WFW-01	0.6	0.6
WFW-03	0.2	0.2
Category II Subtotal	*0.8*	*0.8*
Category III Wetlands		
WFW-06	<0.05	<0.05
WFW-07	0	<0.05
WFW-11	0.3	0.3
WFW-15	0.2	0.2
Category III Subtotal	*0.5*	*0.6*
Total Mainline Impacts	**1.3**	**1.4**
Total Impacts	***4.8***	***4.9***

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities. See Appendix G3, Ecosystem Resources Technical Report, for information about the size and rating of individual wetlands.

(2) The design options for the curve at the northern end of the mainline do not influence the impact footprint of the OMF site; therefore, only one set of impact values is presented for the OMF site.

(3) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Most of the other wetlands that fall within the permanent impact footprint for the South 336th Street Alternative (or whose buffers do) are riverine wetlands associated with East Fork Hylebos Creek Tributary 0016A. Others are depressional or slope wetlands within or near the I-5 right-of-way.

Similar to direct impacts on wetlands, impacts on wetland buffers would occur primarily at the OMF site. The permanent impact footprint of the site overlaps 7.7 acres of wetland buffer, while that of the mainline overlaps 4.0 to 4.5 acres of buffer (Table 3.10-4).

Impacts on Wetland WFW-07 would vary with the track design option at the northern end of the mainline. The TDLE Design Option would intersect a small portion (less than 0.05 acre) of that wetland; the TDLE Preferred Alternative would avoid it, and its buffer, altogether.

South 344th Street Alternative

The extent of long-term impacts on wetlands under the South 344th Street Alternative would be substantially less than under the South 336th Street Alternative, primarily because the OMF site would not impact Wetland WFW-02 (Table 3.10-6). This alternative would have 2.8 to 2.9 acres of permanent impacts on wetlands, compared to 4.8 to 4.9 acres under the 336th Street Alternative (Table 3.10-3). The impacts of the mainline would be similar in scale to those of the South 336th Street Alternative.

Table 3.10-6 Potential Long-Term Impacts of the South 344th Street Alternative on Wetlands

Wetland ID[1]	TDLE Preferred Alternative and Enchanted Parkway tail track alignment	TDLE Design Option and I-5 tail track alignment	TDLE Design Option and Enchanted Parkway tail track alignment	TDLE Preferred Alternative and I-5 tail track alignment
OMF Site Impacts (acres)[2]				
Category II Wetlands				
WFW-01	0.9			
Category II Subtotal	*0.9*			
Category III Wetlands				
WFW-04	0.5			
WFW-18	<0.05			
Category III Subtotal	*0.5*			
Total OMF Site Impacts	**1.4**			
Mainline Impacts[3] (acres)				
Category II Wetlands				
WFW-01	0.6	0.6	0.6	0.6
WFW-03	0.3	0.3	0.3	0.3
WFW-05	0.1	0.1	0.1	0.1
Category II Subtotal	*1.0*	*1.0*	*1.0*	*1.0*
Category III Wetlands				
WFW-04	<0.05	<0.05	<0.05	<0.05
WFW-06	<0.05	<0.05	<0.05	<0.05
WFW-07	0	<0.05	<0.05	0
WFW-11	0.3	0.3	0.3	0.3
WFW-15	<0.05	<0.05	<0.05	<0.05
WFW-17	<0.05	<0.05	<0.05	<0.05
WFW-21	0	<0.05	0	<0.05
Category III Subtotal	*0.4*	*0.5*	*0.4*	*0.4*
Total Mainline Impacts	**1.4**	**1.5**	**1.4**	**1.4**
Total Impacts	***2.8***	***2.9***	***2.8***	***2.8***

Notes: Impact values rounded to the nearest tenth of an acre.

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities. See Appendix G3, Ecosystem Resources Technical Report, for information about the size and rating of individual wetlands.

(2) The design options for the curve at the northern end of the mainline and for the tail tracks do not influence the impact footprint of the OMF site; therefore, only one set of impact values is presented for the OMF site.

(3) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Impacts on wetland buffers for this alternative would occur primarily at the OMF site. Compared to the South 336th Street Alternative, the permanent impact footprint of the site overlaps a slightly smaller area of wetland buffer (6.6 acres, compared to 7.7), while the impacts of the mainline would be greater (6.1 to 6.9 acres, compared to 4.0 to 4.5; see Table 3.10-4).

The direct long-term impacts of the mainline design options on wetlands would be essentially identical. As with the South 336th Street Alternative, the TDLE Preferred Alternative would avoid long-term impacts on Wetland WFW-07 and its buffer. The only difference between the impacts of the tail track options is that the I-5 alignment would affect Wetland WFW-21, while the Enchanted Parkway alignment would avoid that wetland (Table 3.10-6). These differences would be less than 0.05 acre.

3.10.2.3 Construction Impacts

Temporary construction-related impacts would occur where wetlands, wetland buffers, streams, stream buffers, or native forest are affected by clearing, grading, and ground-disturbing work but are revegetated following construction. The temporary impacts of OMF South construction on ecosystem resources are described below. For each ecosystem component, the impacts common to all alternatives are described first, followed by comparisons of the effects of the alternatives.

Aquatic Species and Habitat

Temporary construction-related impacts on aquatic resources would occur where stream buffers are affected by clearing, grading, and ground-disturbing work but are revegetated following construction. In addition to impacts on riparian vegetation, temporary impacts on stream habitats would occur if streams are diverted or placed in temporary pipes, for example, when a stream channel is realigned and reconfigured to accommodate project features. Also, ground-disturbing work and equipment use in or near surface-flowing waters would present the risk of delivering sediment or contaminants (e.g., fuel, hydraulic fluids) to streams, temporarily degrading water quality. The risk of adverse effects would be minimized through the implementation of BMPs during construction and post-construction restoration. Temporary, construction-related impacts on streams and stream buffers are summarized in Table 3.10-7.

The duration of such impacts would vary, depending on the existing condition of the affected area. Where clearing affects low-growing vegetation (e.g., grasses, herbaceous species) or invasive species, the riparian functions of the disturbed areas would likely be restored within one growing season of clearing and replanting. Where invasive species are cleared and replaced with native species, riparian functions may be improved. In contrast, temporary impacts on woody vegetation generally last longer because trees and/or shrubs may require several years or decades to achieve the size and stature necessary to provide preconstruction functions, such as shade and large woody debris recruitment.

Table 3.10-7 Potential Temporary (Construction-Related) Impacts on Aquatic Resources

Alternative	Design Option	Project Element	Stream[1]	Stream Impact (linear feet)[2]	Stream Buffer Impact (acres)[3]
Midway Landfill	N/A	N/A	N/A	0	0
South 336th Street	TDLE Preferred Alternative	Site	East Fork Hylebos Creek Tributary 0016A	150	0.5
			West Fork Hylebos Creek Tributary 0014C[4]	N/A	1.5
		Mainline[5]	East Fork Hylebos Creek Tributary 0016A	350	3.4
	TDLE Design Option	Site	East Fork Hylebos Creek Tributary 0016A	150	0.5
			West Fork Hylebos Creek Tributary 0014C[4]	N/A	1.5
		Mainline[5]	East Fork Hylebos Creek Tributary 0016A	250	2.8
South 344th Street	TDLE Preferred Alternative and Enchanted Parkway tail track alignment	Site	East Fork Hylebos Creek Tributary 0016A	20	0.1
		Mainline[5]		1,350	7.3
	TDLE Design Option and I-5 tail track alignment	Site	East Fork Hylebos Creek Tributary 0016A	20	0.1
		Mainline[5]		1,250	5.9
	TDLE Design Option and Enchanted Parkway tail track alignment	Site	East Fork Hylebos Creek Tributary 0016A	20	0.1
		Mainline[5]		1,250	6.7
	TDLE Preferred Alternative and I-5 tail track alignment	Site	East Fork Hylebos Creek Tributary 0016A	20	0.1
		Mainline[5]		1,350	6.5

Notes:

(1) Both affected streams are Type F, per WAC 222-16-030.

(2) Includes the total length of surface-flowing stream within the construction-related impact footprint defined for this analysis.

(3) Values presented in this table represent all affected areas inside functional stream buffers, including areas that overlap with wetland buffers.

(4) The portion of this stream in the study area lacks a defined bed and bank where it flows through Wetland WFW-02. Direct impacts on the stream are considered permanent and are discussed above. Buffer impacts are based on the affected area of Wetland WFW-02. See text for further discussion.

(5) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Midway Landfill Alternative

The Midway Landfill Alternative would have no temporary construction-related impacts on aquatic resources.

South 336th Street Alternative

Most impacts associated with the South 336th Street Alternative, including lead tracks and mainline, would be long term and are discussed in Section 3.10.2.2. Approximately 500 linear feet of East Fork Hylebos Creek Tributary 0016A would fall within the temporary impact footprint (150 linear feet for the OMF site and 350 feet along the mainline; see Table 3.10-7). Impacts would include temporary loss of riparian habitat function and an elevated risk of water quality

degradation, as described above. A small segment (approximately 130 feet) of East Fork Hylebos Creek Tributary 0016A north of S 336th Street falls within the temporary impact footprint and would likely be placed in a temporary bypass while construction is underway. Site construction would temporarily affect approximately 0.5 acre of stream buffer habitat along East Fork Hylebos Creek Tributary 0016A, and mainline construction would affect approximately 3.4 acres.

Similar to permanent impacts, direct temporary impacts on West Fork Hylebos Creek Tributary 0014C are difficult to quantify because the stream lacks a defined bed and bank in the study area. As with the analysis of permanent impacts, the estimated extent of project-related impacts is based on the linework obtained from the King County iMap interactive mapping tool. No parts of the line representing West Fork Hylebos Creek Tributary 0014C fall within the temporary impact footprint of the South 336th Street Alternative. Though the impacts are not quantifiable, project construction would nevertheless have temporary impacts on the stream, such as temporary loss of riparian habitat function and an elevated risk of water quality degradation, as described above.

Vegetation in and around Wetland WFW-02 supports riparian functions for West Fork Hylebos Creek Tributary 0014C. As with the analysis of permanent impacts, temporary impacts on the stream buffer in that area are identified for this analysis as the extent of temporary impacts on Wetland WFW-02 and its buffer (approximately 1.5 acres).

At the northern end of the study area, the construction-related impacts of the TDLE Preferred Alternative on East Fork Hylebos Creek Tributary 0016A would be greater than those of the TDLE Design Option. Taken together, the total extent of permanent and temporary impacts of the design options on streams and stream buffers impacts would be equal. Under the TDLE Design Option, some of those impacts would be long-term; under the TDLE Preferred Alternative, all impacts would be temporary.

South 344th Street Alternative

Mainline construction for the South 344th Street Alternative would temporarily affect approximately 1,350 linear feet of East Fork Hylebos Creek Tributary 0016A (Table 3.10-7). Similar to the South 336th Street Alternative, this would include temporarily placing approximately 130 feet of the stream in a bypass while construction is underway. This alternative would have no temporary impacts on West Fork Hylebos Creek Tributary 0014C. Site construction would temporarily affect approximately 0.1 acre of stream buffer habitat along East Fork Hylebos Creek Tributary 0016A, and mainline construction would affect approximately 5.9 to 7.3 acres, depending on the mainline design option.

As with the South 336th Street Alternative, the TDLE Preferred Alternative at the northern end of the mainline would have a larger construction-related impact on the northern end of East Fork Hylebos Creek Tributary 0016A as compared to the TDLE Design Option. The direct temporary impacts of the tail track design options on streams would be largely identical. The I-5 alignment would affect more stream/wetland buffer along East Fork Hylebos Creek Tributary 0016A than would the Enchanted Parkway alignment (Table 3.10-7).

Vegetation, Wildlife, and Wildlife Habitat

Construction-related impacts on terrestrial resources would include temporary loss or degradation of terrestrial habitats as well as disturbance due to construction-related noise, light, and human activity. The duration of temporary impacts would vary depending on the type of vegetation that is affected. Impacts on grasses and areas dominated by fast-growing invasive species would generally be short-lived, with functions typically returning to pre-impact performance within one growing season. In contrast, temporary impacts on woody vegetation generally last longer because trees and/or shrubs require several years or decades to achieve the size and stature necessary to provide pre-impact functions, such as canopy habitat. Table 3.10-8 presents a comparison of the build alternatives' potential construction impacts on vegetation in the study area, based on the amount of each land cover type in the construction footprint. Land cover types include both vegetated areas (e.g., forest, grassland) and developed areas (e.g., commercial, residential).

Areas cleared for construction would be susceptible to colonization by noxious weeds and other invasive plants. The risk of colonization would be proportional to the amount of area temporarily disturbed by construction; an alternative with a greater extent of ground disturbance would pose a higher risk of contributing to the establishment or spread of noxious weeds and invasive plants.

In disturbed areas, any of the build alternatives would provide the opportunity to temporarily reduce invasive species, such as Himalayan blackberry, through vegetation removal. In some areas, noxious weeds may be eradicated because cover types dominated by invasive species would be converted to landscaping and other areas where invasive species would be controlled. In areas where invasive species are replaced with native species, construction-related impacts may result in improved habitat function.

Table 3.10-8 Potential Temporary (Construction-Related) Impacts on Vegetation

Alternative	Design Option	Land Cover Type[1]									
		Commercial	Residential	Grassland	Invasive Brush	Non-native Forest	Mature Native Forest	Other Native Forest	Stream/ Wetland	Stormwater Pond	Total
OMF Site Impacts (acres)											
Midway Landfill	N/A	1	<0.5	2	2	0	0	1	0	<0.5	**7**
South 336th Street	N/A	0	1	<0.5	0	<0.5	0	<0.5	<0.5	0	**2**
South 344th Street	N/A	1	0	<0.5	0	<0.5	<0.5	<0.5	<0.5	0	**1**
Mainline Impacts[2] (acres)											
Midway Landfill	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**
South 336th Street	TDLE Preferred Alternative	14	10	3	2	0	2	7	<0.5	<0.5	**38**
	TDLE Design Option	14	9	2	2	0	2	7	<0.5	<0.5	**36**

Table 3.10-8 Potential Temporary (Construction-Related) Impacts on Vegetation (continued)

Alternative	Design Option	Land Cover Type[1]									
		Commercial	Residential	Grassland	Invasive Brush	Non-native Forest	Mature Native Forest	Other Native Forest	Stream/ Wetland	Stormwater Pond	Total
South 344th Street	TDLE Preferred Alternative and Enchanted Parkway tail track alignment	22	10	6	3	0	2	14	1	<0.5	**58**
	TDLE Design Option and I-5 tail track alignment	22	9	5	3	0	2	13	1	<0.5	**55**
	TDLE Design Option and Enchanted Parkway tail track alignment	22	9	5	3	0	2	14	1	<0.5	**56**
	TDLE Preferred Alternative and I-5 tail track alignment	22	10	5	3	0	2	13	1	<0.5	**56**

Notes:

(1) Land cover types are described in Appendix G3, Ecosystem Resources Technical Report.

(2) The Midway Landfill Alternative would not include any mainline construction. The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Midway Landfill Alternative

The extent of temporary construction-related impacts would be substantially smaller under the Midway Landfill Alternative than under the other build alternatives (Table 3.10-8). Also, much less of the other native forest cover type (and no mature forest or and wetland/stream) is within the temporary impact area of this alternative compared to the other two build alternatives. As such, this alternative would have the lowest potential for temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction.

Based on the small size of the temporary disturbance area, this alternative would have the lowest risk of contributing to the establishment and spread of noxious weeds and invasive plants.

South 336th Street Alternative

The construction footprint for this alternative includes a large amount of clearing at the northern end of the mainline to accommodate staging, stockpiling, and other construction activities (see Figure G3.4-9 in Appendix G3, Ecosystem Resources Technical Report). Most of the affected area would consist of the commercial or residential cover types (Table 3.10-8).

The extent of temporary construction-related impacts on the mature native forest and wetland/ stream cover types would be less than that of the South 344th Street Alternative and greater than the Midway Landfill Alternative (Table 3.10-8). Nearly all temporary impacts on vegetation would be associated with construction of the mainline, not the OMF site. The associated potential for temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction would thus be slightly lower than that of the South 344th Street Alternative. The temporary impacts of the South 336th Street and the South 344th Street alternatives on the mature native forest cover type would be similar.

Based on the total extent of temporary, construction-related impacts, the risk of contributing to the establishment and spread of noxious weeds and invasive plants would be less than that of the South 344th Street Alternative and greater than that of the Midway Landfill Alternative.

The TDLE Preferred Alternative for the mainline would have a slightly larger area of temporary impacts compared to the TDLE Design Option (Table 3.10-8). This difference reflects areas at the northern end of the mainline segment that would be permanently impacted under the TDLE Design Option but only temporarily impacted under the TDLE Preferred Alternative.

South 344th Street Alternative

Similar to the South 336th Street Alternative, the construction footprint for this alternative includes a large amount of clearing at the northern end of the mainline to accommodate staging, stockpiling, and other construction activities. In addition, the construction footprint for this alternative extends farther south than that of the South 336th Street Alternative, affecting areas around the I-5/SR 18 interchange (see Figure G3.4-11 and Figure G3.4-12 in Appendix G3, Ecosystem Resources Technical Report). As a result, the total extent of temporary, construction-related impacts under the South 344th Street Alternative would be greater than either of the other build alternatives. As with the South 336th Street Alternative, most of the affected area would consist of the commercial or residential cover types (Table 3.10-8).

The extent of temporary construction-related impacts on the mature native forest and wetland/stream cover types would be greater than that of the South 336th Street Alternative (Table 3.10-8). The associated potential for temporary loss or degradation of terrestrial habitats and disturbance of sensitive wildlife species during construction would thus be greater than that of the South 336th Street Alternative. The temporary impacts of the South 336th Street and the South 344th Street alternatives on the mature native forest cover type would be similar. The extent of temporary, construction-related impacts — and the associated risk of contributing to the establishment and spread of noxious weeds and invasive plants — would be greater than that of the South 336th Street Alternative (Table 3.10-8).

For the same reasons as described for the South 336th Street Alternative, the TDLE Design Option for the curve at the northern end of the mainline would have a slightly smaller area of temporary impacts compared to the TDLE Preferred Alternative. At the southern end of the facility, the design options for the tail tracks would have essentially identical temporary impacts on the mature native forest and wetland/stream cover types, while the Enchanted Parkway alignment would have slightly more impacts on other native forest compared to the I-5 alignment (Table 3.10-8).

Wetlands

Temporary impacts on wetland resources may include reduction or alteration of wetland area, soils, hydrology, vegetation, or type. Construction-related dewatering may temporarily alter groundwater discharge to wetlands. Wetland and wetland buffer functions could also be impacted by soil compaction, accidental spills of hazardous substances, noise and other human-caused disturbance, sedimentation, and introduction of invasive species. Impact areas are summarized in Table 3.10-9. Temporary impacts on wetland buffers are summarized in Table 3.10-10.

The duration of temporary impacts on wetlands would vary, depending on the type of vegetation that is affected. For instance, temporary impacts on emergent wetlands would generally be short-lived, with functions typically returning to pre-impact levels within one growing season. Where invasive species are replaced with native species, construction-related impacts may result in improved habitat function. In contrast, temporary impacts on woody vegetation

generally last longer because trees and/or shrubs may require several years or decades to achieve the size and stature necessary to provide pre-impact functions, such as canopy habitat.

Table 3.10-9 Potential Temporary (Construction-Related) Impacts on Wetlands

Wetland Rating[1]	Alternative		
	Midway Landfill	South 336th Street[2]	South 344th Street[2,3]
OMF Site Impacts (acres)			
Category II Wetlands	0	1.5	0
Total OMF Site Impacts	*0*	*1.5*	*0*
Mainline Impacts[4] (acres)			
Category II Wetlands	0	0.1	0
Category III Wetlands	0	0.1	0.5
Category IV Wetlands	0	<0.05	0.1
Total Mainline Impacts	*0*	*0.2*	*0.6*
Total Impacts	***0***	***1.7***	***0.6***

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities.

(2) The design options for the curve at the northern end of the mainline would have essentially identical impacts (less than 0.05 acre difference) on wetlands.

(3) The impacts of the design options for the tail tracks at the southern end of the South 344th Street Alternative would range from 0.5 to 0.6 acre; see Table 3.10-12 for details.

(4) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Table 3.10-10 Potential Temporary (Construction-Related) Impacts on Wetland Buffers

Alternative/Mainline Design Option		Wetland Buffer Impacts (acres)[1]	Affected Wetland Buffers
OMF Site Impacts			
Midway Landfill		0	N/A
South 336th Street		0.1	WFW-02, WFW-14, WFW-15
South 344th Street		0	N/A
Mainline Impacts[2]			
South 336th Street	With TDLE Preferred Alternative	4.1	WFW-01, WFW-03, WFW-04, WFW-06, WFW-07, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16
	With TDLE Design Option	3.6	
South 344th Street	With TDLE Preferred Alternative and Enchanted Parkway tail track alignment	6.6	WFW-01, WFW-03, WFW-05, WFW-06, WFW-07, WFW-10a, WFW-11, WFW-12, WFW-13, WFW-15, WFW-16, WFW-21, WFW-22
	With TDLE Design Option and I-5 tail track alignment	5.7	
	With TDLE Design Option and Enchanted Parkway tail track alignment	6.1	
	With TDLE Preferred Alternative and I-5 tail track alignment	6.2	

Notes:

(1) Values presented in this table represent all affected areas inside functional wetland buffers, including areas that overlap with stream area and stream buffers.

(2) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Midway Landfill Alternative

The Midway Landfill Alternative would have no temporary construction-related impacts on wetlands because no federally or state-regulated wetlands or wetland buffers fall within the temporary impact footprint of this alternative.

South 336th Street Alternative

Overall, construction-related impacts on wetlands under the South 336th Street Alternative would be greater than under the South 344th Street Alternative (Table 3.10-9), primarily because this alternative would affect Wetland WFW-02 while the South 344th Street Alternative would not (Tables 3.10-11 and 3.10-12). Other than Wetland WFW-02, the only temporary impacts on wetlands would result from construction of the mainline or tail track. Construction of the OMF site and the mainline would also temporarily affect the buffers of several wetlands (Table 3.10-10).

Table 3.10-11 Potential Temporary (Construction-Related) Impacts of the South 336th Street Alternative on Wetlands

Wetland ID[1]	TDLE Preferred Alternative	TDLE Design Option
OMF Site Impacts (acres)[2]		
Category II Wetlands		
WFW-02	1.5	
Category II Subtotal	*1.5*	
Total OMF Site Impacts	**1.5**	
Mainline Impacts[3] (acres)		
Category II Wetlands		
WFW-03	0.1	0.1
Category II Subtotal	*0.1*	*0.1*
Category III Wetlands		
WFW-07	<0.05	<0.05
WFW-10a	<0.05	<0.05
WFW-11	<0.05	<0.05
Category III Subtotal	*0.1*	*<0.05*
Category IV Wetlands		
WFW-13	<0.05	<0.05
Category IV Subtotal	*<0.05*	*<0.05*
Total Mainline Impacts	**0.2**	**0.2**
Total Impacts	***1.7***	***1.7***

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities. See Appendix G3, Ecosystem Resources Technical Report, for information about the size and rating of individual wetlands.

(2) The design options for the curve at the northern end of the mainline do not influence the impact footprint of the OMF site; therefore, only one set of impact values is presented for the OMF site.

(3) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

The direct temporary impacts of the design options for the curve at the northern end of the mainline would be essentially indistinguishable (Table 3.10-11). The design options would differ in their impacts on wetland buffers, with the TDLE Preferred Alternative affecting more of the buffer of Wetland WFW-07, compared to the TDLE Design Option (Table 3.10-10).

South 344th Street Alternative

Construction of the South 344th Street Alternative OMF site would not cause any temporary impacts on wetlands or wetland buffers; all temporary impacts would be associated with mainline construction (Table 3.10-9). The total extent of temporary, construction-related impacts (OMF site and mainline combined) would be substantially less than under the South 336th Street Alternative, primarily because this alternative would not impact Wetlands WFW-02 and WFW-03 (Table 3.10-12). Although this alternative would affect three wetlands that would be avoided by the South 336th Street Alternative (Wetlands WFW-15, WFW-21, and WFW-22), the total area of those impacts would be smaller than the extent of temporary impacts on Wetland WFW-02.

As with the South 336th Street Alternative, the TDLE Preferred Alternative at its northern end would have a larger construction-related impact on the buffer of Wetland WFW-07 compared to the TDLE Design Option. The temporary impacts of the tail track design options for the South 344th Street Alternative would be largely identical (Table 3.10-12), although the I-5 alignment would temporarily affect more of Wetland WFW-21's buffer than would the Enchanted Parkway alignment (see Figures G3.4-5 and G3.4-6 in Appendix G3, Ecosystem Resources Technical Report).

Table 3.10-12 Potential Temporary (Construction-Related) Impacts of the South 344th Street Alternative on Wetlands

Wetland ID[1]	TDLE Preferred Alternative and Enchanted Parkway tail track alignment	TDLE Design Option and I-5 tail track alignment	TDLE Design Option and Enchanted Parkway tail track alignment	TDLE Preferred Alternative and I-5 tail track alignment
OMF Site Impacts (acres)				
Total OMF Site Impacts	**0**			
Mainline Impacts[2] (acres)				
Category III Wetlands				
WFW-07	<0.05	<0.05	<0.05	<0.05
WFW-10 Unit A	<0.05	<0.05	<0.05	<0.05
WFW-11	<0.05	<0.05	<0.05	<0.05
WFW-15	0.2	0.2	0.2	0.2
WFW-21	0.2	0.2	0.2	0.2
Category III Subtotal	*0.5*	*0.5*	*0.5*	*0.5*
Category IV Wetlands				
WFW-13	<0.05	<0.05	<0.05	<0.05
WFW-22	<0.05	<0.05	<0.05	<0.05
Category IV Subtotal	*0.1*	*0.1*	*0.1*	*0.1*
Total Mainline Impacts	**0.6**	**0.6**	**0.6**	**0.6**
Total Impacts	***0.6***	***0.6***	***0.6***	***0.6***

Notes:

(1) Wetland ratings (Hruby 2014) are preliminary and subject to review by permitting authorities. See Appendix G3, Ecosystem Resources Technical Report, for information about the size and rating of individual wetlands.

(2) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

3.10.2.4 Avoidance and Minimization of Impacts

The avoidance and minimization of impacts to ecosystem resources was a guiding principle in the preliminary design of the build alternatives. The development of the design for OMF South was strongly influenced by the presence and location of habitat features, vegetation conditions, and

the potential presence of fish and wildlife. During the conceptual design phase, the project design was adjusted to avoid and minimize impacts on streams, riparian areas, wetlands (Wetland WFW-02 in particular), and areas of mature native forest, particularly along East Fork Hylebos Creek Tributary 0016A. For example, the design of the South 336th Street Alternative includes a retaining wall along the eastern boundary of the OMF site to minimize impacts on the stream and associated wetlands in that area.

Additional avoidance and minimization measures will be implemented, as practical, as project design continues to develop. Sound Transit is exploring options for reducing impacts on West Fork Hylebos Creek Tributary 0014C without jeopardizing the operability of the South 336th Street Alternative. In addition, Sound Transit has committed to minimizing the need for streams to be enclosed in new pipes or culverts and has designed the OMF South alternative to avoid piping any stream channels.

These strategies, along with others designed to avoid or minimize effects on other resources, would be implemented to effectively minimize the potential impacts on sensitive ecosystem resources. Examples of additional strategies include minimizing vegetation clearing, restoring temporarily affected areas, and preparing and implementing a revegetation plan.

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.

3.10.2.5 Indirect Impacts

For aquatic species and habitat, indirect impacts would be minimal because the surrounding areas are already heavily developed. The construction and operation of OMF South should not interfere with future projects that may provide habitat improvements, such as road projects that may improve fish passage or projects that may enhance vegetated and wetland areas in the project corridor. OMF South would be designed to ensure that it would not preclude future culvert replacement(s) by WSDOT to provide fish passage.

Long-term indirect impacts on vegetation, wildlife, and wildlife habitat could include habitat loss or increased disturbance due to changes in land use patterns near the OMF South alternatives. Such impacts would be unlikely under any of the build alternatives, however, because OMF South is not anticipated to influence surrounding land uses, and all three site alternatives are located in areas that are highly developed.

Indirect impacts from OMF South may result in long-term wetland degradation from stormwater discharges and alterations in wetland hydrology; however, stormwater detention and treatment activities would minimize long-term indirect water quality impacts on wetlands.

3.10.3 Potential Mitigation Measures

For unavoidable long-term impacts on streams and stream buffers, Sound Transit would develop a compensatory mitigation plan during the permitting phase in accordance with applicable federal, state, and local requirements and guidelines. Impacts on streams would be mitigated through restoration actions developed in collaboration with federal, state, local, and tribal biologists.

As discussed in Section 3.10.2.2, construction of either the South 336th Street Alternative or the South 344th Street Alternative would require the realignment and restoration of the stream channel for East Fork Hylebos Creek Tributary 0016A. On-site mitigation would be provided by reconfiguring the channel to include meanders and other features that enhance the availability and diversity of aquatic habitats. The new channel would be designed to maintain flows and water quality conditions. Substrate and bank conditions in the realigned channel would be improved from existing conditions.

Sound Transit has committed to achieving no net loss of wetland function and area on a project-wide basis. For unavoidable long-term impacts on wetlands and wetland buffers, Sound Transit would develop a compensatory mitigation plan during the permitting phase in accordance with applicable federal, state, and local requirements and guidelines. These guidelines and regulatory standards include the federal Final Compensatory Mitigation Rule (40 CFR Part 230), interagency guidance contained in Wetland Mitigation in Washington State (Ecology et al. 2006, or as updated), and the applicable local critical areas ordinances.

Compensatory mitigation would be provided for construction impacts lasting more than one growing season and for permanent conversion of wetlands from one vegetation type to another (e.g., forested wetland to emergent or scrub-shrub wetland) as well as for indirect impacts on wetlands. In areas where stream buffers and wetland buffers overlap, mitigation for impacts would be based on the local jurisdiction's requirements for mitigating impacts either to wetland buffers or to stream buffers — whichever requirements are more stringent. Indirect impacts on wetlands would be mitigated based on the impact (e.g., lighting impacts may be mitigated by vegetation screening).

Opportunities for wetland and stream mitigation may be available in the study area and vicinity. In cooperation with resource agencies and tribes, Sound Transit would develop plans to mitigate the effects of the project on wetlands, streams, and regulatory buffers on a watershed basis. To the extent possible, compensatory mitigation sites would be identified and compensate for lost values in kind. It may be necessary to use several sites and mitigation approaches, given the project size, variety of impacts, complexity of identifying mitigation opportunities, and mitigation requirements.

Sound Transit does not anticipate the need to implement mitigation to compensate for diminished habitat functions due to impacts on vegetation outside of streams, wetlands, and their buffers. Measures for mitigating visual impacts resulting from vegetation clearing are described in Section 3.7, Visual and Aesthetic Resources.

The 2008 Federal Compensatory Mitigation Rule sets a higher preference for use of approved wetland mitigation banks and in-lieu fee programs over the development of permittee-responsible mitigation sites. The study area is located within the service areas of a mitigation bank and in-lieu fee program. The Port of Tacoma's Upper Clear Creek mitigation bank was certified in June 2020 and could be available for use to offset project impacts in the Hylebos Creek watershed if credits remain at the time of permitting. The King County In-Lieu Fee Program (Mitigation Reserves Program) has a White River/Puyallup River Service Area, which includes the Hylebos Creek watershed, and could compensate for wetland impacts.

3.11 Water Resources

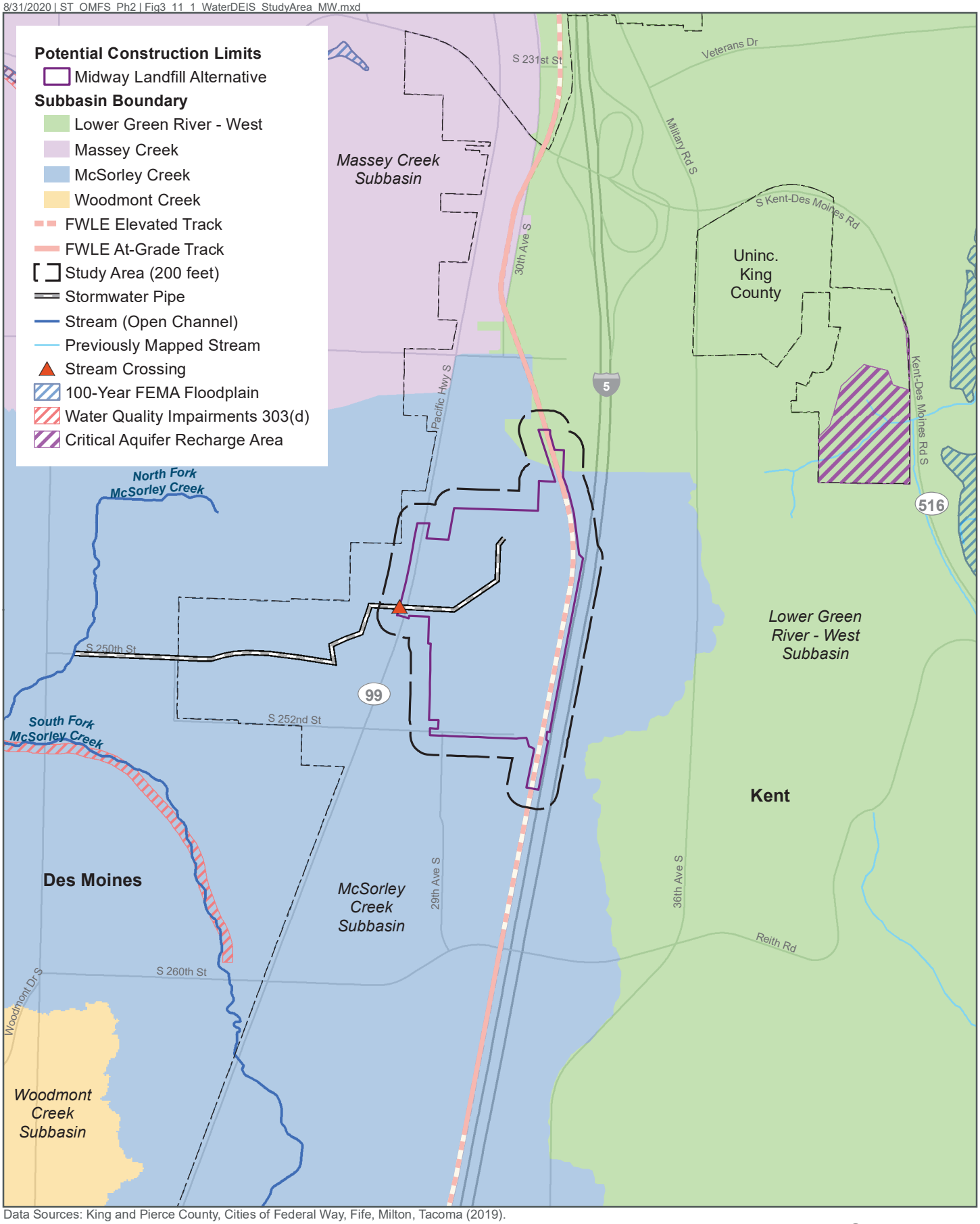
This section discusses potential impacts of the OMF South project alternatives on water resources, which includes surface waters, stormwater utilities, shorelines, floodplains, and groundwater. The amount of stormwater runoff to surface waters and infiltration to groundwater that occurs in a basin is controlled in part by the types of soil and land cover that are present, which are also discussed. Federal, state, and local regulations that govern the protection or use of water resources in the study area have been considered and serve as a basis for the analysis provided in this report.

The cities of Kent and Federal Way are Phase II permittees under Ecology's National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater General Permit (Permit) (Ecology 2017). The Permit requires compliance with BMPs for design related to flow control and water quality as outlined in the Stormwater Management Manual for Western Washington (Ecology 2019) or equivalent manuals. Kent and Federal Way have each adopted the King County Surface Water Design Manual (King County 2016a) and the King County Stormwater Pollution Prevention Manual (King County 2016b), and each city has included amendments to meet their respective needs (City of Kent 2017; City of Federal Way 2017).

The study area includes a 200-foot buffer from the potential construction limits of each alternative, used for the analysis to assess potential impacts on water resources.

3.11.1 Affected Environment

The affected environment includes the surface water, shorelines, stormwater, floodplains, and groundwater resources in the study area, as shown in Figures 3.11-1 and 3.11-2. The Midway Landfill Alternative is located in Water Resource Inventory Area 9, the Green/Duwamish and Central Puget Sound Watersheds. The South 336th Street and South 344th Street alternatives are located in Water Resource Inventory Area 10, the Puyallup-White Watershed, as designated by the Washington State Department of Natural Resources (WDNR).

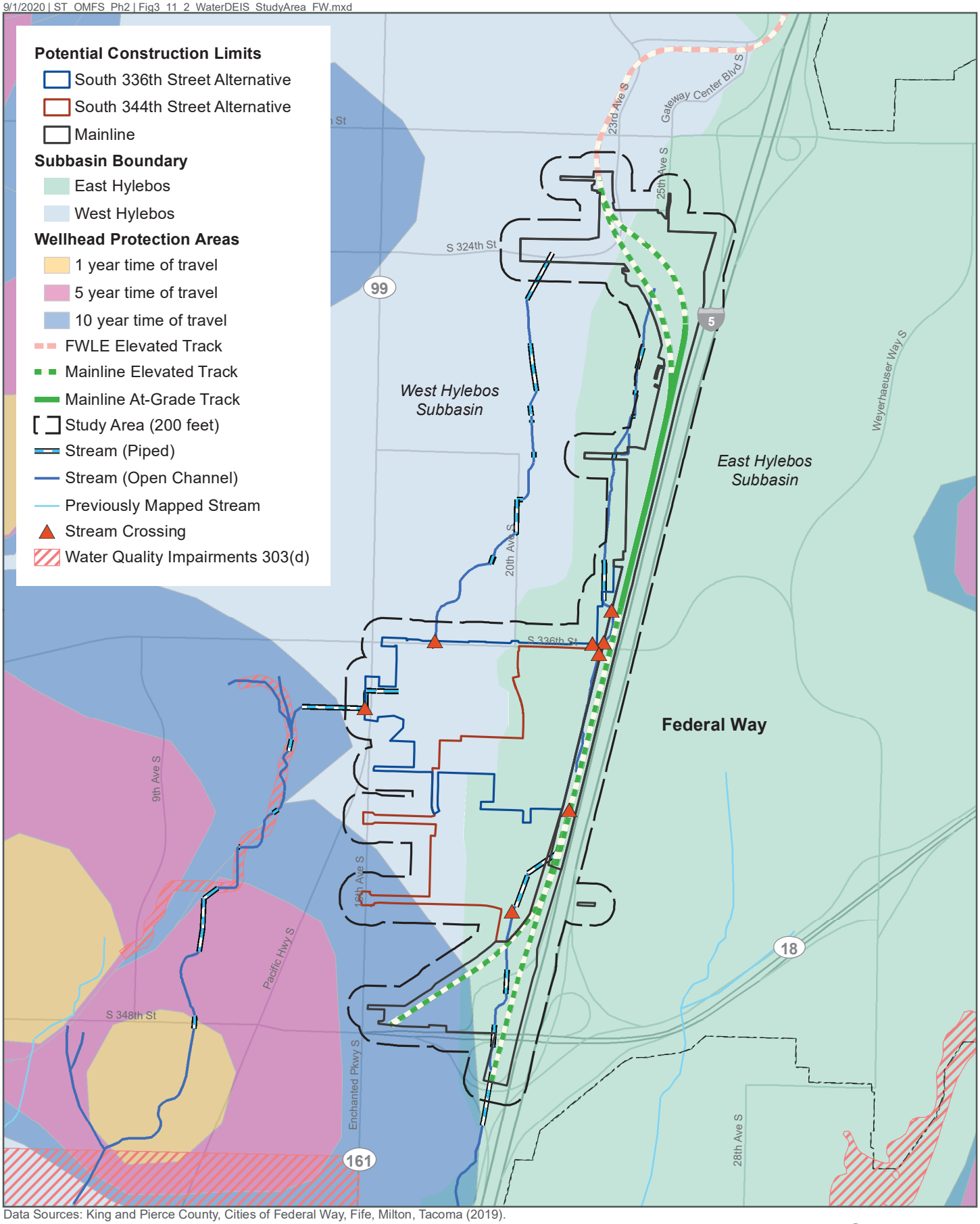


Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

N

0 0.25 0.5 Miles

FIGURE 3.11-1
Water Resources Affected Environment
Midway Landfill Alternative
OMF South



Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

N

0 0.25 0.5 Miles

FIGURE 3.11-2
Water Resources Affected Environment
South 336th Street and South 344th Street Alternatives
OMF South

Stormwater Runoff Characteristics Related to Hydrologic Soil Group

Soils are classified into Hydrologic Soil Groups based on physical and runoff characteristics, which can be used along with land use and hydrologic condition to generally estimate runoff and infiltration capacities. The study area contains Hydrologic Soil Groups A, B, and D, and Pits (Figures 3.11-3 and 3.11-4). Group A has low runoff potential and moderate- to high-infiltration potential and is generally compatible with a variety of low impact development approaches to stormwater facilities (USDA NRCS 2007, 2019a, 2019b). Group B has moderately low runoff potential and moderate infiltration capacity. Group D has high runoff potential and tends to restrict water movement and infiltration. Some portions of the study area have dual hydrologic classifications (B/D), where the first classification applies to the dry condition and the second to the wet condition.

The Midway Landfill is classified as Pits, which is a pit-fill soil with properties modified by years of solid waste disposal and fill processes (USDA NRCS 2007) and not included in any hydrologic soil group.

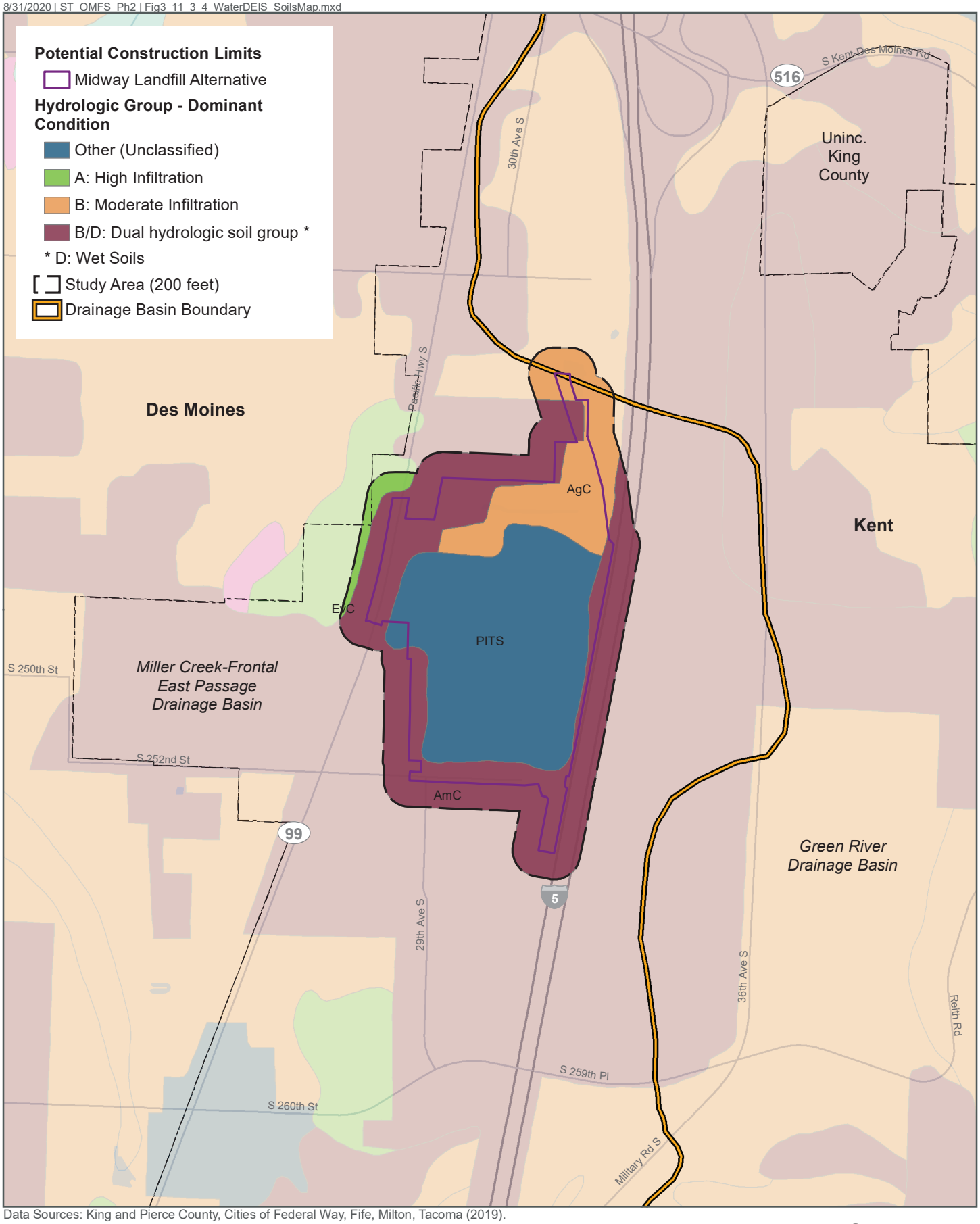
Stormwater Runoff Characteristics Related to Land Use

Most of the basin areas occupied by the build alternatives are urbanized, with impervious surface cover currently ranging from approximately 50 to 80 percent. The Midway Landfill Alternative is a 68-acre site in Kent that was a gravel pit operation from 1945 to 1966 and a landfill for the city of Seattle from 1966 to 1983. The site was listed as a Superfund site in May 1986, and cleanup was completed September 2000. The cleanup included covering the landfill with an engineered multilayer cap with a top layer of till grass, installing a gas extraction system to remove and control methane gas, and making improvements to the surface water drainage system, such as grading, alterations, and creation of a surface water holding pond (Ecology 2005).

The South 336th Street and South 344th Street alternatives located in Federal Way are a mix of suburban/residential, commercial, industrial, and recreational land use. Other developed portions of the study area include major roadways (I-5, SR 99, SR 18, SR 161, and SR 167), as well as surrounding suburban developments.

Natural Water Bodies

The surface waters in the Midway Landfill Alternative study area discharge to the urban stream basin of McSorley Creek in in the Lower Puget Sound–Des Moines/Federal Way Watershed, while the South 336th Street and South 344th Street alternatives discharge to the Hylebos Creek basin in the Puyallup–White Watershed (Figures 3.11-1 and 3.11-2). The surface streams in the study area are each part of a drainage system that ultimately discharges to Puget Sound. Only streams in the immediate vicinity of the alternatives or those receiving surface flows from the sites will be discussed here. Details regarding streams, typing, and classification are presented in Section 3.10, Ecosystems.

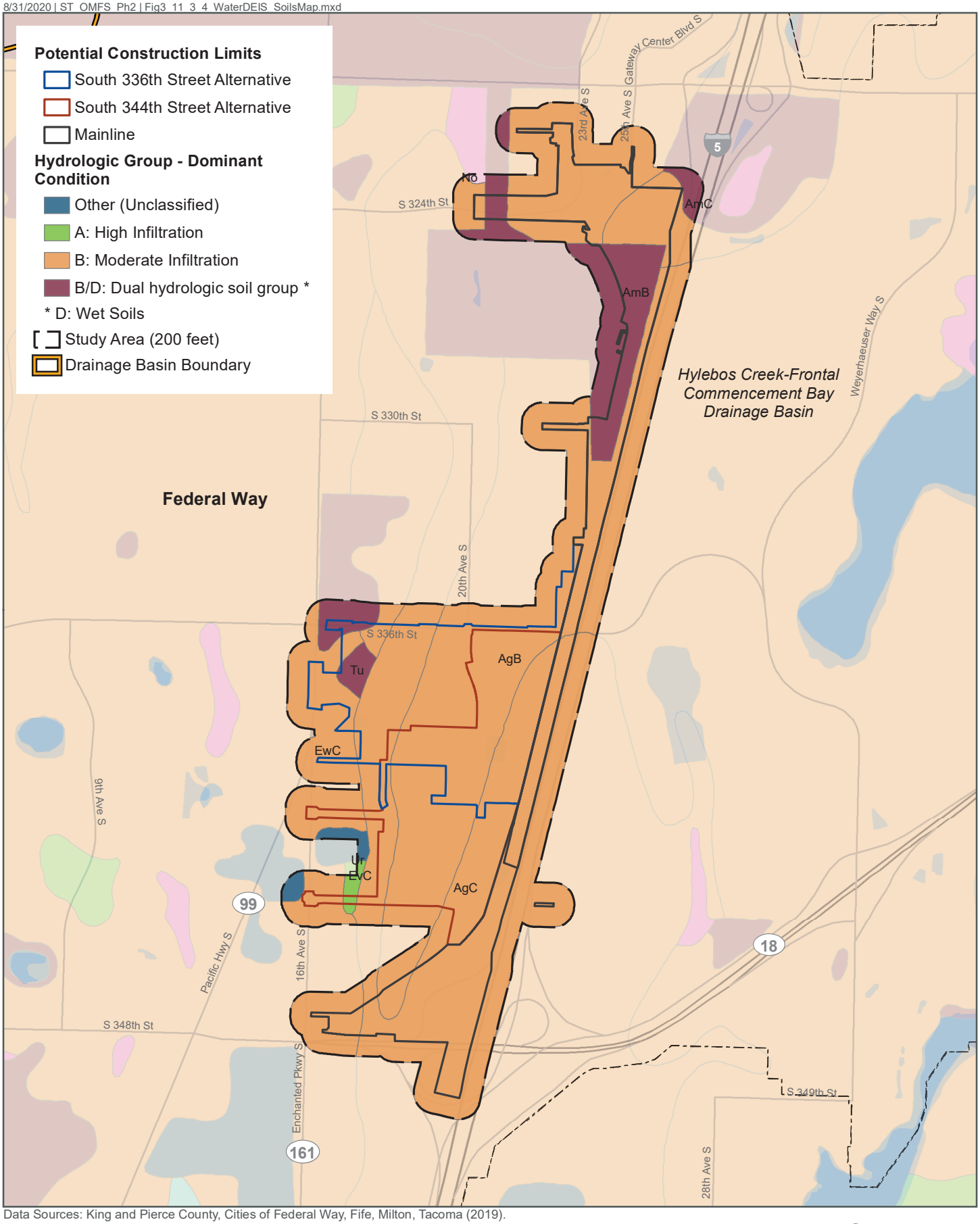


Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

N

0 0.25 0.5 Miles

FIGURE 3.11-3
Study Area Hydrologic Soil Groups
Midway Landfill Alternative
OMF South



Data Sources: King and Pierce County, Cities of Federal Way, Fife, Milton, Tacoma (2019).

N

0 0.25 0.5 Miles

FIGURE 3.11-4
Study Area Hydrologic Soil Groups
South 336th Street and South 344th Street Alternatives
OMF South

The surface waters in the study area have been historically impacted by urbanization, and all the streams have reaches that are either piped within stormwater facilities or are confined within straight and narrow channels that lack complexity. The industrial and urban development in the study area has prompted restoration efforts to protect water quality and wildlife habitat. Ecology designates waters with beneficial uses such as drinking water, recreation, aquatic habitat, and industrial use that are historically and currently impaired by pollutants on the Water Quality Assessment Clean Water Act Section 303(d) list. If a project site discharges to any of the listed bodies of water, additional treatment or flow control measures may be required. The following sections describe each water body in the study area and identify those designated as impaired on the 303(d) list. Table 3.11-1 identifies water quality impairments and the documented floodplains associated with each stream.

- **McSorley Creek.** The on-site stormwater facility at the Midway Landfill discharges to the North Fork of McSorley Creek, approximately 1 mile west of the study area (Figure 3.11-1). The North Fork originates in Des Moines and joins the South Fork in confluence in Saltwater State Park to form McSorley Creek before it discharges to Puget Sound. The main branch of McSorley Creek has a documented fish presence, and several fish barriers have been identified on the North Fork of McSorley Creek downstream of the Midway Landfill. The 303(d) list identifies no water-body impairments for North Fork McSorley Creek, but 1.2 miles downstream of the Midway Landfill, McSorley Creek has been listed for bacterial and dissolved oxygen impairments (Ecology 2012).
- **Hylebos Creek.** The Hylebos Creek basin is made up of the East and West Forks of Hylebos Creek and their respective tributaries (Tributaries 0016A and 0014C), all of which join in confluence before discharging to Puget Sound's Commencement Bay via the Hylebos Waterway, approximately 6.9 miles downstream. Historically, the Hylebos Creek basin has seen extensive and rapid suburban development that has led to a loss of stream and wetland function and value. Development has altered the natural hydrologic balance, which has negatively impacted both hydrologic functions of flow control and water quality and resulted in increased flooding, erosion, and water quality impairments as well as loss of aquatic habitat and life (King County 1990).
  - East Fork Hylebos Creek Tributary 0016A flows through the eastern portion of both the South 336th Street and South 344th Street alternatives just west of I-5 (Figure 3.11-2). There is currently no documented fish use in East Fork Hylebos Creek Tributary 0016A, which includes intermittent flows, lack of sufficient pool depths to hold fish during periods when the stream channel is dry, and the presence of barriers between the study area and potential population sources downstream (WDFW 2019a, 2019b). East Fork Hylebos Creek Tributary 0016A does not have any listed 303(d) water quality impairments (Ecology 2012).
  - West Fork Hylebos Creek Tributary 0014C flows through the northwestern corner of the project limits of the South 336th Street Alternative, through a wetland (WFW-02) serving as an in-line stormwater detention facility with no defined channel, before entering a long piped segment that joins several other tributaries to form the West Fork of Hylebos Creek (Figure 3.11-2). There is presently no documented fish presence in West Fork Hylebos Creek Tributary 0014C, which could be attributed to human-created barriers, but it indicates a future potential to support fish if the barriers were to be removed (WDFW 2019a, 2019b). Heavy urbanization and development in the upper watershed have likely contributed to elevated levels of pollutants associated with vehicle use, including metals such as copper, lead, and zinc, which are listed on the 303(d) water quality assessment impairments along with pH (Ecology 2012).

Table 3.11-1 Potentially Affected Surface Water Bodies

Surface Water Body	Stream Index Number[1]	Alternative	Water Quality Impairments[2]	Water Quality Impairments Category[2]	FEMA Floodplains[3]
Lower Puget Sound Basin					
North Fork McSorley Creek[4]	09.0382	Midway Landfill	None	None	None
McSorley Creek[4]	09.0381	Midway Landfill	Bacterial Dissolved Oxygen	5	None
Hylebos Creek Basin					
East Fork Hylebos Creek Tributary 0016A	10.0016A	South 336th Street South 344th Street	None	5	None
West Fork Hylebos Creek Tributary 0014C	10.0014C	South 336th Street South 344th Street	Copper Lead pH Zinc	5	None

Notes:

(1) Water Resource Inventory Area identification numbers according to King County (1990).

(2) According to the 303(d) Water Quality Impairment List (Ecology 2012).

(3) According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) (53053C0968E, 53033C1250F) (FEMA 1995).

(4) No surface flowing portion of North Fork McSorley Creek is within the study area; however, because the Midway Landfill Alternative may potentially discharge stormwater to the stream, which discharges to McSorley Creek downstream, it has been included in this analysis.

Stormwater Management Systems

In the study area for all three alternatives, there are conveyance systems and management facilities that receive stormwater from the sites. The surface stormwater runoff is collected in piped municipal systems that consist of stormwater facilities, ditches, media filter drains, stormwater ponds, and vaults. The stormwater system also connects to piped stream reaches and historically modified wetlands that serve as in-line detention and flood control facilities (King County 1990). The modifications to the natural hydrologic system have historically disrupted natural flow patterns and processes, such as infiltration and groundwater recharge, and resulted in water quality degradation.

The Midway Landfill has a regional stormwater facility that receives stormwater from off-site areas. The storm drain system downstream of that regional facility routes stormwater through Kent and ultimately discharges into McSorley Creek within Des Moines. The South 336th Street and South 344th Street alternative sites discharge into regional stormwater facilities within Federal Way. The use of existing on-site or downstream regional stormwater management facilities for OMF South stormwater management will be considered further as design advances and a preferred alternative is identified.

Shorelines

No regulated shorelines of the state have been identified within the study area (City of Kent 2009; City of Federal Way 2011, 2014).

Floodplains and Floodways

No regulated floodplains have been identified within the study area, either on adopted FEMA Flood Insurance Rate Maps or preliminary Flood Insurance Rate Maps (FEMA 1995).

Groundwater

The Midway Landfill Alternative is not located within any of the Wellhead Protection Areas (up to 10-year travel times, i.e., the area where groundwater takes 10 years to travel to the well) or Critical Aquifer Recharge Areas (categories 1 through 3) as identified by King County. As previously discussed, the Midway Landfill was listed as a Superfund site, with cleanup completed in 2000. The cleanup included covering the unlined landfill with an engineered multilayer cap and making improvements to the surface water drainage system (Ecology 2005). Rainwater is collected from the surface of the landfill and released into the North Fork of McSorley Creek. While some groundwater contamination at the site is above federal drinking water standards, there are no active sources of drinking water collection in the Midway Landfill Alternative study area. Kent's drinking water supply is mainly provided by a well drilled into an underground aquifer.To meet additional system demands, Kent sources water from partnerships with Lakehaven Water and Sewer District, Covington Water District, and Tacoma Water to obtain surface water from the Green River Watershed (City of Kent 2018).

The South 336th Street and South 344th Street alternatives are located within Federal Way's 100-year Wellhead Capture Zone, and both alternatives have a permanent impact footprint that grazes the fringe of the 10-year travel zone for the Wellhead Protection Area (Figure 3.11-2). Lakehaven Water and Sewer District manages the three main aquifer systems that underlie the city — the Redondo-Milton Channel Aquifer, the Intermediate Aquifer System (Mirror Lake and Eastland Upland Aquifers), and the Deep Aquifer — in cooperation with Federal Way. To protect the drinking water supply, they have implemented both the state of Washington's Wellhead Protection Program and Section 1428 of the 1986 Amendments to the Federal Safe Drinking Water Act (City of Federal Way 2015). There are no sole-source aquifers designated by EPA in the study area of any of the alternatives (EPA 2019).

3.11.2 Environmental Impacts

3.11.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to water resources from construction or operation of OMF South would not occur. FWLE will increase impervious surfaces in the Midway Landfill Alternative study area, which could create additional erosion and pollutants in nearby streams. However, Sound Transit has designed FWLE to include required stormwater management and BMPs to protect surface waters from this impact. Other planned projects could impact water resources, but they would be required to manage stormwater effectively and minimize impacts to water resources. Because TDLE would open after OMF South, impacts associated with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

3.11.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Surface Water Resources

An increase in impervious surfaces (from new maintenance yards, associated mainline, stormwater ponds, parking areas, building roofs, project road improvements, etc.) is associated with any area where vegetation or other pervious surface is converted to paved surface. These surfaces are associated with an increase in runoff volumes and decrease in groundwater recharge, which may increase flooding and flow frequencies. Also, the increased surface flow volumes and water quality impairments can contribute to stream erosion and aquatic habitat degradation. OMF South would add both pollution-generating impervious surfaces and non-pollution-generating impervious surfaces in the study areas for the proposed alternatives. Pollution-generating impervious surfaces are subject to vehicular use and include parking areas, bus holding areas, project-associated roads or road realignments, and yard and apron areas; these areas have the potential to accumulate contaminants that can be transported by stormwater runoff into receiving water bodies. Non-pollution-generating impervious surfaces are not subject to vehicular use and include the light rail tracks,[2] sidewalks, and rooftops, and stormwater ponds.

Tables 3.11-2 and 3.11-3 summarize the range of impervious surface changes that would result from OMF South for the three build alternatives when compared with existing conditions.

Floodplains and Floodways

All of the build alternatives are outside of mapped FEMA floodplains, and the preliminary design for the alternatives would span the mapped stream crossings without columns being placed within the boundaries. As a result, no impacts on mapped FEMA floodplains or floodways are expected.

Groundwater

The proposed build alternatives would not be located within groundwater protection boundaries and are not anticipated to adversely impact groundwater resources.

Shorelines

No regulated shorelines of the state exist within the study area; therefore, no impacts on shoreline resources would result from any of the proposed alternatives.

[2] Sound Transit and Ecology entered into a Memorandum of Understanding dated December 9, 2019, in which Sound Transit agreed to conduct a study to characterize the quality of the stormwater discharged from light rail mainlines. The data and analysis from the study will be used to inform the design of light rail projects that are scheduled in the Sound Transit 3 Plan to be completed between 2030 and 2041, and, as necessary, Sound Transit will identify all known, available, and reasonable methods of prevention, control, and treatment (abbreviated as AKART) to define light-rail specific BMPs. OMF South is scheduled to be completed before 2030.

Table 3.11-2 Study Area Impervious Surface Land Cover Changes

Alternative with Mainline Track Options	Project Element	Existing (acres)	Proposed (acres)	Change (acres)
Midway Landfill Alternative	OMF Site	53	98	+45
South 336th Street Alternative				
TDLE Preferred Alternative	OMF Site	125	144	+19
	Mainline[1]	4	12	+8
	Total	**129**	**156**	**+27**
TDLE Design Option	OMF Site	125	144	+19
	Mainline[1]	5	14	+9
	Total	**130**	**158**	**+28**
South 344th Street Alternative				
TDLE Preferred Alternative and Enchanted Parkway tail track alignment	OMF Site	168	182	+14
	Mainline[1]	6	16	+10
	Total	**174**	**198**	**+24**
TDLE Design Option and I-5 tail track alignment	OMF Site	168	182	+14
	Mainline[1]	4	15	+11
	Total	**172**	**197**	**+25**
TDLE Design Option and Enchanted Parkway tail track alignment	OMF Site	168	182	+14
	Mainline[1]	7	17	+10
	Total	**175**	**199**	**+24**
TDLE Preferred Alternative and I-5 tail track alignment	OMF Site	168	182	+14
	Mainline[1]	5	17	+12
	Total	**173**	**199**	**+26**

Sources: Existing land cover analysis developed from project survey data and aerial imagery using GIS. Proposed land cover analysis developed from project design files using GIS.

Note:

(1) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Table 3.11-3 Pollution-Generating Impervious Surface Land Cover Changes

Alternatives with Mainline Track Options	Project Element	Existing (acres)	Proposed (acres)	Change (acres)
Midway Landfill Alternative	OMF Site	40	54	+14
South 336th Street Alternative				
TDLE Preferred Alternative	OMF Site	93	93	0
	Mainline[1]	2	5	+3
	Total	**95**	**98**	**+3**
TDLE Design Option	OMF Site	93	93	+0
	Mainline[1]	2	7	+5
	Total	**95**	**100**	**+5**

Table 3.11-3 Pollution-Generating Impervious Surface Land Cover Changes (continued)

Alternatives with Mainline Track Options	Project Element	Existing (acres)	Proposed (acres)	Change (acres)
South 344th Street Alternative				
TDLE Preferred Alternative and Enchanted Parkway tail track alignment	OMF Site	129	128	-1
	Mainline[1]	4	6	+2
	Total	**133**	**134**	**+1**
TDLE Design Option and I-5 tail track alignment	OMF Site	129	128	-1
	Mainline[1]	2	5	+3
	Total	**131**	**133**	**+2**
TDLE Design Option and Enchanted Parkway tail track alignment	OMF Site	129	128	-1
	Mainline[1]	4	8	+4
	Total	**133**	**136**	**+3**
TDLE Preferred Alternative and I-5 tail track alignment	OMF Site	129	128	-1
	Mainline[1]	3	7	+4
	Total	**132**	**135**	**+3**

Sources: Existing land cover analysis developed from project survey data and aerial imagery using GIS. Proposed land cover analysis developed from project design files using GIS.

Note:

(1) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

Midway Landfill Alternative

For the water resources impact analysis, the landfill area of the Midway Landfill Alternative was conservatively categorized as grass. However, the surface of the landfill is actually grass overlying a membrane cap with an on-site surface water collection system that prevents surface water infiltration. Using this conservative analysis assumption, the Midway Landfill Alternative would convert the greatest amount of land cover to new impervious as well as create the greatest amount of new pollution-generating impervious surfaces among the alternatives.

The Midway Landfill Alternative includes the site of a former landfill, which presents both short-term risks associated with construction and long-term risks and benefits associated with permanent structures and operational activities. Over time, waste in the landfill, settles at different rates, creating an uneven surface that contributes to engineering challenges and long-term operational and maintenance concerns. Additionally, Midway Landfill is a Superfund site and is under active monitoring and reporting to ensure that the cleanup measures continue to function as planned, which includes an active methane gas extraction system.

Sound Transit has analyzed three potential subsurface construction design options for siting an OMF on the landfill, all of which would be compatible with the current FWLE design of an at-grade mainline. Common to the three subsurface construction design options would be the replacement of the landfill cap to prevent surface water and stormwater from entering any remaining portion of landfill. These options are discussed in detail in Chapter 2, Alternatives Considered.

The Platform subsurface construction design option would position the OMF structure higher above the landfill and would allow continued operational access at the site for ongoing monitoring, testing, and management of landfill materials, as needed. However, the elevated

platform option could create pathways for groundwater contamination through the installation of concrete-filled drilled shafts.

The placement of the slab and beam system in the Hybrid subsurface construction design option has the potential to partially impede long-term monitoring of and mitigation access to the hazardous materials in the landfill and could create pathways for the contamination to enter the groundwater table through the installation of concrete-filled drilled shafts. In contrast, this option could improve local groundwater quality in the long term through potential improvement of the cap and membrane containment system by bringing it up to current protection standards. The Platform and Hybrid subsurface construction design options for the Midway Landfill Alternative, which require concrete-filled drilled shafts or other structures to be installed, would need to be designed to prevent the downward migration of more contaminated groundwater or leachate to the aquifer below.

The Full Excavation subsurface construction design option would have the greatest long-term benefit to water resources in the study area by potentially removing sources of contamination of surface and groundwater resources.

South 336th Street Alternative

The South 336th Street Alternative, including both mainline design options, would convert approximately 20 fewer acres of land to impervious cover than the Midway Landfill Alternative and a similar amount to all mainline and tail track combinations of the South 344th Street Alternative. The South 336th Alternative would create approximately 10 fewer acres of new pollution-generating impervious surfaces compared to the Midway Landfill Alternative and would create a similar amount of new pollution-generating impervious surfaces compared to the South 344th Street Alternative. These alternatives would mainly redevelop existing parking lots and commercial business areas, in addition to some undeveloped areas along the I-5 corridor.

The South 336th Street Alternative design includes placement of a retained fill slope within a portion of a wetland (WFW-02) that is serving as an in-line stormwater detention facility, through which West Fork Hylebos Creek Tributary 0014C currently flows. The loss of storage in the detention facility resulting from the proposed fill slope could affect downstream flow regimes in West Fork Hylebos Creek. The facility was designed to control the magnitude and duration of flood events in the lower basin resulting from high-intensity precipitation events, so loss of storage would be offset by mitigation storage elsewhere to avoid or minimize any potential impacts. The degree of impact depends on the amount of fill placed below the design water surface elevation as well as the extent to which it would infringe upon the vegetation and habitat in the wetland.

If the South 336th Street Alternative is identified as the preferred alternative, the project team would work with Federal Way to design a retrofit option for existing regional facilities receiving discharge, which could reduce the stormwater facility footprint and meet treatment needs. Federal Way requires redevelopment structures to return flow control regimes to fully forested predevelopment conditions. In addition, the proposed on-site facilities have been designed to separate stormwater from the flows of the West Fork Hylebos Creek Tributary 0014C until they have received water quality treatment, to avoid impacts to water quality.

The South 336th Street Alternative proposes to realign approximately 1,600 linear feet of East Fork Hylebos Creek Tributary 0016A, which could potentially benefit stream habitat by adding channel sinuosity and habitat complexity. When existing structures and paved areas are redeveloped to current stormwater design standards, downstream receiving waters benefit because of improved

flow control and water quality treatment. In addition, relocation and redesign of heavily modified conveyance systems that return them to more naturally connected states can result in beneficial impacts on water resources. A full discussion of habitat and stream buffer details is presented in Section 3.10, Ecosystem Resources.

South 344th Street Alternative

All of the combinations of mainline and tail track options associated with the South 344th Street Alternative would convert approximately 20 fewer acres of land cover to an impervious condition than the Midway Landfill Alternative and would convert similar amounts of land as compared to the South 336th Street Alternative. Both mainline options for the South 344th Street Alternative would create the least amount of new pollution-generating impervious surfaces when paired with the Enchanted Parkway tail track alignment. The South 344th Street Alternative, paired with the I-5 tail track alignment, would also create slightly fewer new pollution-generating impervious surfaces as compared to the South 336th Street Alternative. These alternatives would mainly redevelop existing parking lots and commercial business areas in addition to some undeveloped forested areas along the I-5 corridor. The South 344th Street Alternative would have similar long-term impacts to stormwater runoff as the South 336th Street Alternative because of similar increases in impervious surfaces.

The South 344th Street Alternative is located in a commercial and industrial area that is bordered by the I-5 corridor to the east. In contrast to the South 336th Street Alternative, the South 344th Street Alternative would have no impacts on West Fork Hylebos Creek Tributary 0014C. The design proposes to realign and meander East Fork Hylebos Creek Tributary 0016A and daylight an approximately 800-foot-long section of currently piped stream. An existing WSDOT stormwater facility at the southeast corner of the site would need to be relocated because the project would partially fill it. The remaining area would be used for the stream.

Similar to the South 336th Street Alternative, the proposed realignment and restoration of 2,800 linear feet of East Fork Hylebos Creek Tributary 0016A could potentially benefit habitat by adding channel complexity. When existing structures and paved areas are redeveloped to current design standards, it can result in a positive impact to downstream receiving waters because of improved flow control and water quality treatment. In addition, relocation and redesign of heavily modified conveyance systems that return them to more naturally connected states can result in beneficial impacts on water resources. A full discussion of habitat and stream buffer details is presented in Section 3.10, Ecosystem Resources.

3.11.2.3 Construction Impacts

Impacts Common to All Build Alternatives

OMF South construction would primarily affect surface and groundwater quality by increasing the potential for flooding, erosion, or degrading water quality when runoff is generated in construction areas. In general, OMF South build alternatives would have similar potential construction-related impacts on water resources because of similarities in construction equipment and techniques. The activities that could affect water resources include:

- **Earthwork, trench work, stockpiling, and material transport.** Soil exposed in sloped excavations, fills, or trench work is especially susceptible to erosion until vegetation is established or the surface is stabilized with pavement. If exposed soil becomes dry, it can be eroded by wind. Loose soil can be carried off site by water or wind to stormwater drains or streams, where it increases water turbidity. Construction vehicle tires can carry soil onto

roadways, where it can then be washed into ditches or streams during storms. Increased turbidity from sediment reduces light transmission as well as decreases dissolved oxygen in the water.

- **Concrete work and paving.** The pH in surface water can be increased to levels harmful to fish and wildlife if runoff mixes with process water or slurry from concrete work or curing concrete.
- **Stream crossings.** Over-water work, stream relocations, and construction in stream buffers can pose a direct risk to water quality through pollutant spills, sediment transport, or wind deposition of stockpiled materials.
- **In-water work.** The risk of scour is usually increased during the construction phase of in-water work. This has the potential to mobilize sediments at the project site and contribute to turbidity and sedimentation.
- **Construction machinery.** Equipment leaks or spills can affect water quality in nearby water resources. Hydrocarbons and other hazardous materials associated with construction machinery can create imbalances to parameters such as pH levels or dissolved oxygen in the water.

Midway Landfill Alternative

Construction-related impacts on water resources are expected for each of the three Midway Landfill Alternative subsurface construction design options. Each has the potential to release contaminated air, soil, and groundwater through excavation or installation of concrete-filled shafts. Substantial remediation would be necessary, including cleanup and proper disposal of any excavated materials during construction to minimize contamination as well as groundwater monitoring in the surrounding area. Any transport of the hazardous materials being removed through excavation increases the risk of mobilizing them in the environment by exposure to wind, rain, and runoff, which could impact water resources at the site, along the transportation route, and those present at the final disposal destination.

The Platform subsurface construction design option involves drilling support shafts, which could affect water resources by compromising the landfill cap membrane and creating pathways for downward mobilization of contaminants into the groundwater and ultimately the aquifer recharge system in surrounding areas. The entire cap membrane system would be removed and replaced after the shafts have been installed to avoid this possibility. However, cap removal has the potential to prolong or increase exposure and mobilization risks associated with hazardous materials known to be present at the site.

The Hybrid subsurface construction design option involves some excavation with placement of a slab and beam system at grade for the tracks and drilling support shafts to support the buildings at the site. The partial excavation and drilling would involve the removal and replacement of the entire cap membrane system and has the potential to prolong or increase exposure and mobilization risks associated with hazardous materials known to be present at the site.

The Full Excavation subsurface construction design option would pose the greatest risk during construction for exposure and mobilization of hazardous materials present in the sediments being removed. This option has the most substantial excavation and therefore the greatest potential for a spill or mobilization of contaminated groundwater and sediments.

South 336th Street Alternative

West Fork Hylebos Creek Tributary 0014C runs through the northwest corner of the South 336th Street Alternative, which has a wetland (WFW-02) functioning as an in-line stormwater detention facility. Clearing and grading activities, including the placement of fill in the combined wetland/stormwater facility, could lead to short-term degradation of water quality through sedimentation and turbidity impacts. Construction-related impacts on East Fork Hylebos Creek Tributary 0016A from the mainline track options would be higher for the TDLE Preferred Alternative than for the TDLE Design Option. Full impacts analysis associated with the stream buffer and linear length in proximity to construction is presented in Section 3.10, Ecosystem Resources.

South 344th Street Alternative

The daylighting of East Fork Hylebos Creek Tributary 0016A has the potential for direct risk to water quality through pollutant spills, sediment transport, or wind deposition of stockpiled materials due to the proximity of construction work to the stream channel. The risk of scour is usually increased during the construction phase of in-water work, which has the potential to mobilize sediments at the project site and contribute to turbidity and sedimentation.

The South 344th Street Alternative OMF site would have fewer temporary impacts to East Fork Hylebos Creek Tributary 0016A than the South 336th Street Alternative OMF site. However, the South 344th Street Alternative mainline (including all design options) would have more temporary impacts to East Fork Hylebos Creek Tributary 0016A than the South 336th Street Alternative mainline and, therefore, would also have more total temporary impacts to the stream. Between the mainline design options for the South 344th Street Alternative, the TDLE Preferred Alternative would have more temporary impacts to East Fork Hylebos Creek Tributary 0016A than the TDLE Design Option, and the tail track options would have identical temporary stream impacts. Full impacts analysis associated with the stream buffer and linear length in proximity to construction is presented in Section 3.10, Ecosystem Resources.

3.11.2.4 Avoidance and Minimization of Impacts

Sound Transit seeks to prevent or minimize potential impacts on water resources by implementing project design and development measures that follow local stormwater management regulations, using required BMPs, encouraging sustainable LID approaches where feasible, and preparing for climate-related uncertainties where practicable. In addition to traditional stormwater management facilities, BMPs also include project planning measures, design elements, implementation practices, inspections, and monitoring. This section discusses BMPs that would be included in the project design regardless of the findings of this water resources impact analysis. Therefore, they are not considered mitigation measures and are instead part of the proposed alternatives.

Sound Transit's Link Design Criteria Manual (Sound Transit 2020) requires project-related stormwater management to conform to the requirements of the local jurisdictions. These measures include minimizing impervious footprints, avoiding placement of design-related structural elements in or near water resources and their associated buffers when possible, and installing or upgrading water quality treatment and flow control facilities when required.

In addition, based on Sound Transit design standards (Sound Transit 2020) and Ecology requirements (Ecology 2019), stormwater management facilities would be designed using LID approaches where feasible (Puget Sound Partnership 2012). However, due to the presence of till-

type soils with low infiltration and high runoff potential in the study area, the use of infiltration-based LID approaches may not be well suited, and other stormwater management approaches may be necessary.

Measures Common to All Build Alternatives

Flow Control

Conservative flow control strategies would be implemented by controlling runoff based on a target of forested land use conditions. Proposed BMPs were developed using a conservative approach to drainage concepts, consulting the Western Washington Hydrology model developed by Ecology to estimate hydrology and facility sizing, and could include detention ponds, detention vaults, mainline dispersion, bioretention, and infiltration facilities. Currently, the use of underground detention vaults is assumed for all alternatives. However, as design progresses, flow control may be provided by stormwater ponds or a combination of facility types.

Water Quality Treatment

The project would provide water quality management to enhanced treatment standards (intended to provide a higher rate of removal of dissolved metals than basic treatment) for all post-project pollution-generating impervious surfaces. This is expected to prevent impacts to surface water and groundwater quality.

Use of Existing Facilities

Outlets from stormwater management facilities could connect to existing regional facilities receiving discharge, which could reduce the stormwater facility footprint necessary to meet treatment needs. This potential will be evaluated as the design progresses, after a preferred alternative has been identified.

Construction

Construction-related impacts on water resources would be prevented or minimized by complying with the NPDES Construction Stormwater General Permit, the WDFW Hydraulic Project Approval (as required), and applicable guidance manuals. Sound Transit would develop and implement a Construction Stormwater Pollution Prevention Plan to serve as the overall construction stormwater mitigation plan. This plan would be submitted to Ecology and required to be implemented for the duration of construction as part of the NPDES Construction Stormwater General Permit compliance. The Construction Stormwater Pollution Prevention Plan would include the following measures:

- Temporary erosion and sediment control
- Spill prevention, control, and countermeasures
- Concrete containment and disposal
- Dewatering management
- Fugitive dust control

Specific BMPs would be designed based on the manuals previously mentioned throughout this section. BMPs could potentially include:

- Developing construction plans for sensitive areas such as streams and their buffers
- Phasing the work to minimize the amount of disturbed area at any one time
- Stabilizing construction entrances, haul roads, and other surfaces that could produce erosion or sediment tracking
- Providing tire wash, silt fence, stockpile covers, and other protection measures to avoid sediment transport
- Containing and controlling concrete, fuel, and hazardous materials on-site
- Installing temporary ditches, erosion control covering, and temporary piped conveyances to protect slopes from concentrated runoff
- Implementing stream protection measures, including diverting stream flow around the construction area, and limiting the construction period to the required "work window," a period of the year when fish would be minimally affected

Midway Landfill Alternative

For the Midway Landfill Alternative, Sound Transit would implement BMPs that include material handling and disposal plans for contaminated media and hazardous construction debris developed in conjunction with the appropriate regulatory agencies. All of the subsurface construction design options for the Midway Landfill Alternative would require placement of a low-infiltration cap to protect water resources in accordance with the current Superfund remedy, which could exclude the potential for infiltration-based LID approaches and make other stormwater management approaches necessary.

Special precautions at Midway Landfill would be required for temporary drainage systems and surface treatment after removing and during replacement or remediation of the existing membrane cover system, as part of the Construction Stormwater Pollution Prevention Plan. A project-wide contaminated media management plan may also be developed and implemented. A discussion of the impacts related to construction at a site with known hazardous substances is presented in Section 3.13, Hazardous Materials. Any of the subsurface construction design options for the Midway Landfill would require Ecology and/or EPA approval to amend the existing Cleanup Action Plan and Record of Decision to confirm that the project would maintain the commitments currently in place for the landfill, including protection of water resources.

South 336th Street Alternative

Due to the proposed placement of fill slope in the wetland (WFW-02) through which West Fork Hylebos Creek Tributary 0014C is routed, the wetland hydroperiod would need to be evaluated in accordance with Ecology requirements (Ecology 2019) to identify potential impacts to water resources and to design required flow control and water quality treatment.

Measures for mitigating impacts to water quality resulting from stream channel relocation for the South 336th Street Alternative could include those outlined by the WDFW in Chapter 13 of the Water Crossing Design Guidelines (Barnard et al. 2013). This could involve preventive BMPs, such as erosion and sediment control measures, the use of cofferdams, complete stream bypass, and restorative planting efforts. The construction of the South 336th Street Alternative would have the potential to impact water quality parameters such as turbidity; however, through

compliance with applicable construction permits and the BMPs incorporated by the permits, the risks to water resources would be minimized.

A full discussion of potential wetland and stream impacts and protection measures is provided in Section 3.10, Ecosystem Resources.

South 344th Street Alternative

Similar to the South 336th Street Alternative, compliance with applicable construction permits and BMPs would minimize risks to water quality during construction. Measures for mitigating impacts to water quality resulting from stream channel relocation for the South 344th Street Alternative would be similar to those discussed above for the South 336th Street Alternative but would need to be applied to the longer stream segment proposed for relocation and would include conversion of the piped stream to a more natural daylighted condition.

A full discussion of potential wetland and stream impacts and protection measures is provided in Section 3.10, Ecosystem Resources.

3.11.2.5 Indirect Impacts

No indirect impacts related to water resources would result from construction and operation of the proposed project.

3.11.3 Potential Mitigation Measures

With application of required stormwater BMPs, such as the flow control or treatment facilities described in Section 3.11.2.4, Avoidance and Minimization of Impacts, no temporary or long-term adverse impacts on water resources are expected and no mitigation would be required. Mitigation for ecosystem impacts related to wetlands, streams and their buffers is addressed in Section 3.10, Ecosystem Resources. Seasonal limitations for in-water work (including stream relocations) will likely be required by resource agencies during permitting.

3.12 Geology and Soils

This section addresses topography, geology, soil characteristics, geological hazards, and groundwater location and potential impacts to these resources from the OMF South project alternatives. These considerations affect project design construction methods. The study area includes resources within 100 feet of the potential construction limits of the alternatives.

In addition to the relevant regulations considered in all environmental analyses, the Washington State Growth Management Act (RCW 36.70A) requires all cities and counties to identify critical areas within their jurisdiction and develop regulations to protect them. Among the critical areas are geologically hazardous areas, which are defined as areas that are not readily suited for development because of their susceptibility to erosion, sliding, earthquake-induced damage, or other geologic events. The OMF South build alternatives are in Kent and Federal Way, both of which have adopted geologic sensitive and critical area ordinances.

Regional and site-specific data and topographic and geological maps, including online resources, were used to identify and describe surface geology, soils information, and geologic hazards. Sources include the U.S. Geological Survey, the U.S. Department of Agriculture, WDNR, and local county references. In addition to this desktop analysis, geotechnical explorations of the build alternatives were completed to assess site-specific elements of these locations.

3.12.1 Affected Environment

3.12.1.1 Topography

Elevations in the study areas are similar, ranging from 400 to 450 feet above sea level. Topographical features in the study area include various drainage systems, small water bodies, and associated topographic features indicative of Pleistocene continental glaciation.

3.12.1.2 Geology

The study areas are primarily underlain by Vashon till, a glacial till consisting of a generally unsorted mixture of clay, silt, sand, cobbles, and boulders deposited by continental Pleistocene glaciation. The regional geology includes glacially consolidated soils and sediments to a depth of over 1,200 feet near the Midway Landfill Alternative to almost 1,600 feet beneath the ground surface near the South 344th Street Alternative (Jones 1996). Before it was used as a landfill, the Midway Landfill Alternative site was a gravel pit. Excavation exposed Pleistocene sand and gravels of glacial origin below the Vashon till. The areas beneath the highway on/off-ramps and overpasses directly adjacent to the South 336th Street and South 344th Street alternatives consist of Holocene artificial fill.

3.12.1.3 Soils

Soils within the study area for all build alternatives primarily consist of gravelly sandy loams and sandy loams that have developed on the Pleistocene continental glacial drift of the Vashon till described above. Generally, these soils are moderately to excessively well drained. Many of the original soils within the project area have been removed or modified by land development.

3.12.1.4 Soil, Aggregate, and Rock Resources

There are no existing economic soil, aggregate, or rock resources located within the study area. As noted, the Midway Landfill Alternative site was a gravel pit before 1966 when it was converted to a landfill.

3.12.1.5 Geotechnical Characteristics and Hydrogeology

Midway Landfill Alternative

The Midway Landfill Alternative site contains municipal solid waste underlain by native glacially derived sand, gravel, and glacial till. The municipal solid waste is estimated to be deepest in the southeast portion of the landfill, where waste fill thickness could be up to 130 feet or more. It is believed that the municipal solid waste fill thickness decreases to the north and west, where it is thought to typically be about 50 to 60 feet thick (City of Kent 2019).

The municipal solid waste fill is underlain by advance outwash soils and till deposits. The advance outwash soils generally consist of sand and gravel that were deposited by streams or rivers in front of the advancing continental glaciers. The till deposits are generally classified as compact silts and sands that have been glacially overridden. Shallow groundwater adjacent to the landfill occurs as discontinuous lenses at a depth of approximately 30 feet below ground surface. Leachate within the solid waste fill has been noted at depths of 30 to 40 feet below ground surface. See Appendix D4, Midway Landfill Human Health Risk Assessment, for further information regarding geotechnical characteristics at the Midway Landfill.

South 336th Street and South 344th Street Alternatives

Understanding of the subsurface in the vicinity of the South 336th Street and South 344th Street alternatives is based on work completed for the S 336th Street/I-5 overcrossing and the I-5/SR 18 interchange (Shannon & Wilson 2020). The soil beneath the build alternative sites, including the mainline and tail tracks, are thought to include a 5- to 15-foot-thick layer of surficial fill soil that is associated with past site development. The composition and compactness of the fill is unknown and likely to be highly variable. Beneath the fill, native soils consist of dense to very dense glacial sand and gravel outwash and glacial till. The groundwater table is anticipated to be shallow at the site, ranging from 10 to 15 feet below the existing ground surface.

3.12.1.6 Geologic Hazards and Resources

Seismicity and Earthquakes

Earthquake hazards in the study area are primarily related to the convergent plate boundary of the North American continental plate and the Juan de Fuca oceanic crustal plate, known as the Cascadia Subduction Zone. This subduction zone boundary has a long history of large earthquakes (Frankel and Peterson 2008).

Additionally, intracrustal faults, such as the Seattle and Tacoma faults, can rupture, which can also cause substantial ground displacement and shaking. The Seattle Fault lies approximately 9 miles north of the Midway Landfill Alternative, and it is unlikely it would cause ground displacement in the study area. The Tacoma Fault Zone runs east-west through the South 336th Street and South 344th Street alternatives study area and has the potential to produce a major seismic event and ground rupture (Gomberg et al. 2010). The Tacoma Fault Zone lies approximately 3 miles south of the Midway Landfill Alternative.

Volcanic Hazards

Mount Rainier, an active stratovolcano located approximately 40 miles to the southeast, has produced substantial lahars (a mud or debris flow composed of water, debris, and pyroclastic material) in the Puyallup River Valley that have reached Puget Sound. The most recent lahar to reach Puget Sound occurred approximately 5,600 years ago. Based on the historical extent of lahar deposits (WDNR 2020), the three OMF South alternatives are unlikely to be affected by a lahar originating from Mount Rainier.

Landslides, Steep Slopes, and Erosion Hazards

Landslide hazard areas are generally defined as areas prone to earth movements through a combination of site factors, including slope, local geologic and soil conditions, precipitation and groundwater flow, freeze/thaw cycles, seismic events, and human impacts. Historical landslides, steep slopes (over 40 percent), and erosion hazards (a consideration of slope and soil types and characteristics) have not been mapped in the study area.

Soil Properties

Particular soil properties can be challenging for development and infrastructure projects. Soils with particular textures, pH, and salt contents can be corrosive to both concrete and uncoated steel. Within the project area, multiple soil types in the study areas are considered corrosive to steel (USDA NRCS 2020).

Hydric soils are generally described as having been formed in saturated environments and having a water table close to ground surface. These soils create surface conditions susceptible to standing water and are generally limiting for construction purposes.

Groundwater Resources

The Midway Landfill Alternative is not located within any of the Wellhead Protection Areas (up to 10-year travel times) or Critical Aquifer Recharge Areas (categories 1 through 3). The South 336th Street and South 344th Street alternatives are located within Federal Way's 100-year Wellhead Capture Zone, and both alternatives have a permanent impact footprint that touches the outer edge of the 10-year travel zone for the Wellhead Protection Area. There are no sole source aquifers designated by EPA in the study area of any of the build alternatives. Groundwater resources are discussed in further detail in Section 3.11, Water Resources.

3.12.2 Environmental Impacts

A summary of long-term, construction, and indirect impacts to geologic and hydrogeologic conditions is presented below.

3.12.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to geology and soils from construction or operation of OMF South would not occur. FWLE will conduct some grading and filling in the Midway Landfill Alternative study area, adjacent to I-5, but these impacts to geology and soils will be relatively minor. Other projects planned to be constructed within the alternative study areas may impact geology depending on the extent of grading and filling activities. However, these impacts are also anticipated to be minor. Because TDLE would open after OMF South, impacts associated

with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

3.12.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

The build alternative sites are located on highly urbanized land, and long-term effects on existing geologic and hydrogeologic conditions are likely to be limited. Long-term effects related to the completion and operation of OMF South that could occur are discussed below. All three build alternatives are in areas of relatively flat topography, and existing slope stability and landslide issues would be of minor concern during the period of operation.

Project structures, including elevated mainline, lead, and tail tracks, would be designed to withstand a major seismic event, as all build alternatives are located within a seismically active area. Strong shaking has the potential to cause settlement, slope instability, and increased lateral pressure on retaining walls. Facilities would be designed in accordance with the International Building Code, which would result in an increased resistance to seismic shaking and reduce risk to the project. Each build alternative is located in areas of low seismic liquefaction potential. Areas assessed to be more highly susceptible to liquefaction (including areas of introduced fill) would be assessed during final design.

Long-term changes in groundwater flow after construction are not expected.

Midway Landfill Alternative

Naturally corrosive soils as well as potentially corrosive leachate or groundwater within or in the vicinity of the Midway Landfill may compromise steel or concrete structures. Based on specific site conditions, structures can be designed with materials that resist the corrosivity of site-specific soil, groundwater, or leachate characteristics. The Platform and Hybrid subsurface construction design options for the Midway Landfill Alternative, which require support structures to be installed, would need to be designed to prevent the downward migration of more contaminated groundwater or leachate to the aquifer below.

While the Full Excavation subsurface construction design option removes all refuse from the landfill and replaces it with competent fill, the Platform and Hybrid subsurface construction design options would require alteration and replacement of the landfill gas mitigation system required by the EPA Record of Decision. Additionally, each subsurface construction design option would require the removal and replacement of at least a portion of the cap required by the Record of Decision. The Platform and Hybrid subsurface construction design options would leave refuse in place, which could lead to settlement issues within the project area. See Appendix D1, Midway Landfill Site Engineering Optimization Report for more details.

South 336th Street and South 344th Street Alternatives

There are no additional impacts specific to the South 336th Street and South 344th Street alternatives beyond those discussed above, under Impacts Common to All Build Alternatives.

3.12.2.3 Construction Impacts

Impacts Common to All Build Alternatives

The extent of earthwork needed for the build alternatives is dependent on site-specific topography, planned future site grades, and the usability of existing site soils for reuse. The nature and composition of excavated site soils would be evaluated for reuse as structural fill for construction purposes. Some soils that are not suitable for reuse as structural fill may be used for other on-site purposes if the need exists. Table 3.12-1 shows relative approximate cut and fill volumes for the alternatives and assumes that all unusable cut materials would need to be exported. The cut volume for the Midway Landfill Alternative includes soils and landfill materials. Imported fill in the table would be soil. For the Platform and Hybrid subsurface construction design options at the Midway Landfill Alternative, there would also be imported concrete (approximately 531,000 and 165,000 cubic yards respectively).

Table 3.12-1 Cut and Fill Volumes for the OMF South Build Alternatives

Alternative	Cut Volume (cubic yards)	Cut Volume Reuse[1] (cubic yards)	Imported Soil Fill (cubic yards)	Material Removed from Site (cubic yards)
Midway Landfill –Platform	1,010,000	340,000	0	670,000
Midway Landfill – Hybrid	4,270,000	1,710,000	1,240,000	2,560,000
Midway Landfill – Full Excavation	4,870,000	1,950,000	1,610,000	2,920,000
South 336th Street[2]	640,000	310,000	60,000	330,000
South 344th Street[2]	580,000	270,000	200,000	310,000

Notes:

(1) Reusable quantities of cut volume are assumed to be 40% for Midway Landfill alternatives and 80% for the South 336th Street and South 344th Street alternatives.

(2) Volume estimates do not include quantities for the mainline or tail track construction. The quantities would be relatively small and would be associated with building the foundations for the elevated portions of track and the short length of mainline that would be built on retained fill.

If either the Full Excavation or Hybrid subsurface construction design option is chosen for the Midway Landfill Alternative, leachate and/or local groundwater would need to be managed during the excavation process. With a shallow groundwater table expected in the vicinity of the South 336th Street and South 344th Street alternatives, there may also be a need for dewatering or managing groundwater in deeper excavations, depending on design requirements.

If dewatering is required, the water would likely need to be treated on site or disposed of at an approved facility. For the Midway Landfill Alternative, removal of leachate or locally impacted groundwater from the vicinity of the project area would improve overall groundwater quality in the region. Any dewatering during excavation may impact groundwater flow direction in the vicinity of the study area for all build alternatives. In the case of the Midway Landfill Alternative, pumping water and/or leachate from the landfill itself would draw surrounding groundwater (and associated contaminants) toward the landfill, which would not be likely to negatively affect groundwater quality in the vicinity of the landfill.

Aside from the potential need to address groundwater and leachate during excavation and to import fill for the Midway Landfill Alternative Full Excavation and Hybrid subsurface construction design options, there would be no appreciable differences in construction impacts to geology and soils between the build alternatives.

3.12.2.4 Avoidance and Minimization of Impacts

During construction, the following BMPs could be used to address the potential short-term erosion of soils within the construction area:

- Minimizing areas cleared of vegetation
- Providing temporary cover or mulch for exposed soil stockpiles
- Using erosion control blankets on exposed slopes

Short-term impacts to shallow groundwater quality from construction activities could be minimized by:

- Containing and controlling waste and hazardous materials onsite
- Confining maintenance and refueling activities to areas where excavations would not be impacted
- Preventing downward migration of contaminants in groundwater during shaft drilling using seals and reduced casing size at the Midway Landfill.

In addition to the geotechnical borings that were installed during the preliminary engineering phase, Sound Transit would conduct additional geotechnical studies during final design. These studies would include borings and other exploration methods, laboratory testing of soil, and detailed foundation design for the project. This work would inform and refine the project design and construction techniques and potential mitigation measures. The project design would meet state and federal design and construction codes for transportation projects.

If dewatering is required for construction of the Midway Landfill Alternative, contaminated groundwater concerns would be considered during design in compliance with future amendments to the Ecology Cleanup Action Plan or EPA Record of Decision. Current Cleanup Action Plan and Record of Decision requirements include continued operations and maintenance of site remedial actions, including the low permeability cap, the landfill gas extraction and monitoring system, and the surface water management system. Institutional controls implemented as part of the Record of Decision require the city of Seattle to continue operating and maintaining these remedial actions and provide an annual review of groundwater quality downgradient of the landfill.

Additionally, excavation of the Midway Landfill is expected to be restricted so as not to allow work during the wet season, which in western Washington is considered to be October 1 through April 31. This would reduce the amount of precipitation that could come in contact with the exposed refuse, which then could become contaminated water that could contribute to the contaminated groundwater at the site. Any of the subsurface construction design options for the Midway Landfill would require Ecology and/or EPA approval to amend the Cleanup Action Plan and Record of Decision to confirm that the project would maintain the commitments currently in place for the landfill, including protection of groundwater.

Depending on design, dewatering and groundwater management may be needed due to shallow groundwater in the vicinity of the South 336th and South 344th Street alternatives. For all build alternatives, methods could include localized dewatering and groundwater injection, using sheet-pile walls, or freeze-shoring for horizontal groundwater containment.

3.12.2.5 Indirect Impacts

No indirect impacts related to geology and soils would result from construction and operation of the proposed project.

3.12.3 Potential Mitigation Measures

With appropriate use of engineering design standards and BMPs, geological and soils impacts are not expected, and additional mitigation is not required.

3.13 Hazardous Materials

A hazardous material is any substance that — because of its quantity, concentration, or physical or chemical properties — may pose a hazard to human health and the environment, either by itself or through interaction with other factors. Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Hazards to human health and the environment can occur during production, storage, transportation, use, or disposal of hazardous materials.

Hazardous materials or substances, hazardous wastes, petroleum products and wastes, and contaminated environmental media (including soils, sediments, surface water, and groundwater) are present within the study area and could potentially result in impacts to human health and the environment during construction activities or long-term operation activities.

The study area for the hazardous materials analysis includes the area within a 1/8-mile radius of the potential construction limits for each build alternative. Properties farther than 1/8 mile were not considered for further analysis because they present a low probability of having hazardous materials releases that could affect the study area.

This hazardous materials analysis identifies properties near the OMF South project alternatives recognized to have hazardous materials issues associated with current or historical site activities or that have a documented release to the environment. Types and locations of sites were identified to evaluate potential impacts to construction, property ownership, and general public health and safety.

Within the study area for each build alternative, the hazardous materials analysis included review of data from the Environmental Data Resources Inc. (EDR) database, review of historical land use, and a visual windshield survey to confirm the results of the database review. The EDR reports summarize federal, state, and local database information for the areas located within a 1/8-mile radius of each build alternative. This information — along with the Ecology Cleanup Site Search database — was used to evaluate the three build alternatives, with an emphasis on known sites on, adjacent to, or near each alternative.

3.13.1 Affected Environment

The affected environment within the project study area was assessed by reviewing the state and federal regulatory database records as described above. The identified sites were ranked based on the proximity to the study area, the type and number of databases in which the site was found, known releases of hazardous materials or petroleum products, and the status of remediation or cleanup efforts at sites with known releases. One of three risk categories was assigned to sites within the study area: high, medium, and low.

- **High Risk.** Sites that involve substantial contamination of large areas, including soil, groundwater, and multiple contaminants, and might represent higher risk of further releases of hazardous materials to human health or the environment; that would be likely to involve high levels of regulatory approvals or extensive or lengthy remediation activities that may create other impacts to the environment; or that could pose major delays to the development of the project.

- **Medium Risk.** Sites where the nature of potential contamination is known based on existing investigation data, the potential contaminants are not extremely toxic or difficult to treat, and probable remediation approaches are straightforward.
- **Low Risk.** Sites where the nature of potential contamination is known based on existing investigation data and the sites are not expected to have notable impacts on the project due to their location, or sites where hazardous materials were used but had no or only very small reported releases.

Table 3.13-1 lists the risk categories assigned to properties found during the regulatory records search within the 1/8-mile study area for each build alternative. These sites are also shown on Figures 3.13-1 and 3.13-2.

Table 3.13-1 Number of Hazardous Material Sites within Study Areas

Build Alternative	High Risk	Medium Risk	Low Risk
Midway Landfill Alternative	1	4	43
South 336th Street Alternative	0	5	53
South 344th Street Alternative	0	5	59

3.13.1.1 Midway Landfill Alternative

Background

The Midway Landfill is a Superfund site owned by the city of Seattle and managed by SPU. It is regulated by the Ecology and EPA under an existing Ecology Consent Decree and Cleanup Action Plan and EPA Record of Decision.

The Midway Landfill was originally a gravel pit, which operated from 1945 to 1966. SPU began landfill operations at the site in 1966, accepting primarily demolition-type wastes. The landfill closed in 1983. Approximately 3,000,000 cubic yards of solid waste, reported to include demolition materials and wood waste as well as two million gallons of industrial liquids, were deposited at the unlined landfill facility (EPA 2015). Refuse depths in some areas are up to 130 feet.

When the landfill closed, concerns were raised regarding negative impacts to human health and the environment. Testing indicated landfill gas outside the landfill's boundary, and organic and inorganic contaminants were found in groundwater.

An active landfill gas management system was installed in 1985, and in 1986 the Midway Landfill was placed on the National Priorities List due to the groundwater contamination. With the listing, EPA assumed responsibility for facility oversight. Pursuant to Washington State's Model Toxics Control Act, SPU entered into a Consent Decree with Ecology in 1990 to initiate cleanup work.

The basis of action is groundwater contamination above federal drinking water standards. Original contaminants of concern include 1,2-dichloroethane, vinyl chloride, and manganese. During the 2010 to 2015 Five-Year Review period, 1,4-dioxane was detected above Model Toxics Control Act Method B levels and is also considered a potential contaminate of concern.

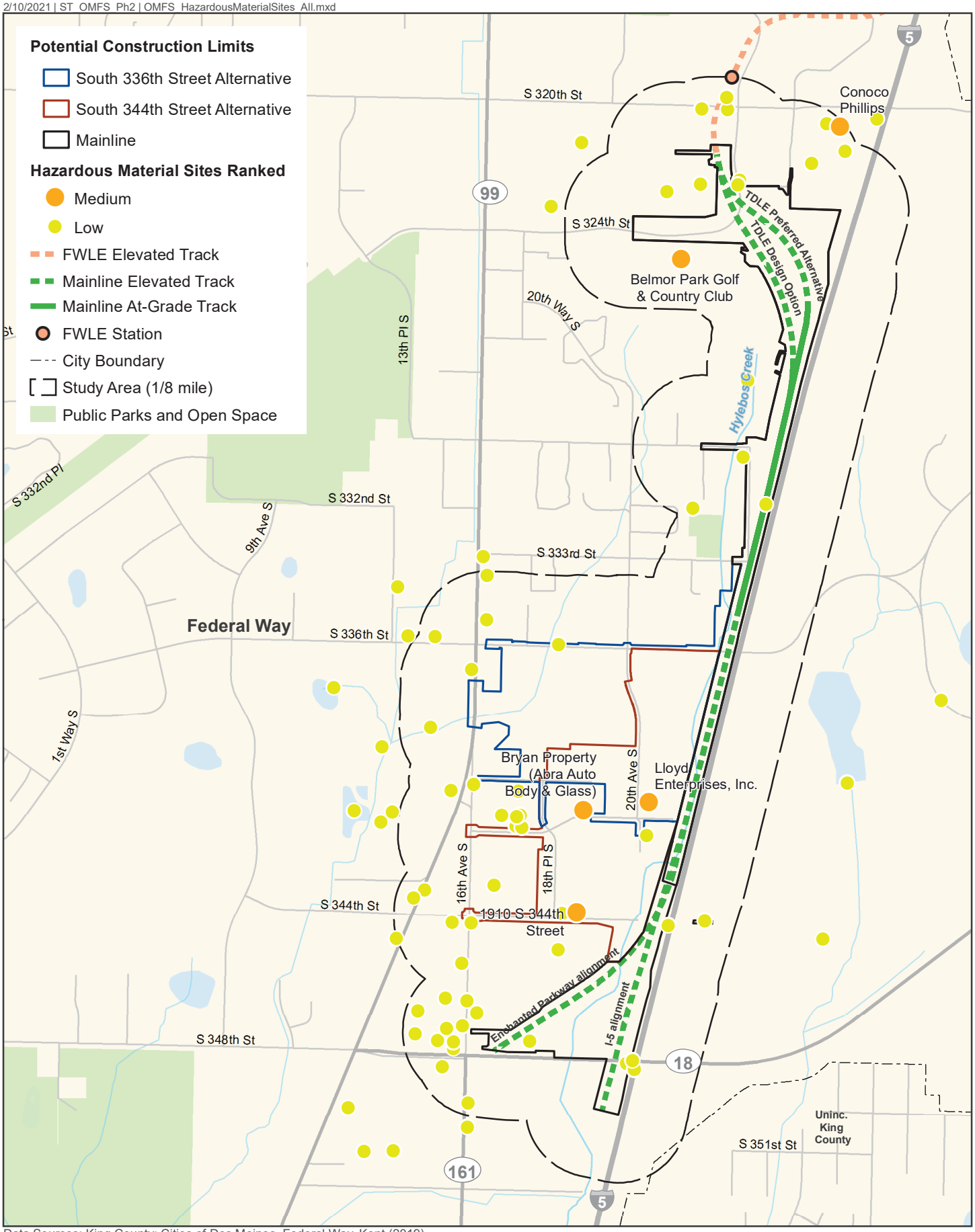
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE 3.13-1
Hazardous Material Sites
Midway Landfill Alternative

OMF South



Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE 3.13-2
Hazardous Material Sites
South 336th Street and South 344th Street Alternatives

OMF South

A final remedy for the site was identified in a Record of Decision by EPA, with Ecology's concurrence, on September 6, 2000. The identified remedy's aim was to ensure refuse containment is effective and maintained, groundwater quality is restored beyond the landfill boundary, and that no residential exposure to groundwater occurs until standards have been met.

The site is covered with a landfill cap. The cap layers from bottom to top, are a 12-inch-thick layer of low permeability (1 x 10^{-7} cm/sec) soil/clay material; a 50-millimeter-thick, high-density polyethylene geomembrane; drainage geonet; geotextile; a 12-inch-thick drainage layer; and a minimum 12-inch-thick topsoil layer. The cap is designed to keep precipitation from reaching the buried refuse, where it could contaminate groundwater.

SPU completed installation of the landfill cap, methane collection system, and surface water management system in 1992; however, since the Record of Decision was not signed at that time, construction completion was not officially recognized until September 21, 2000.

SPU has continued to manage and maintain the site with regular environmental reporting, including required Five-Year Review Reports by the EPA completed in 2005, 2010, and 2015.

Regulatory Database Review

The Midway Landfill is classified as a high-risk hazardous materials site. As described above, the property was added to the National Priorities List in 1986 for known groundwater, soil, and air contamination that remains at the site. A 2005 Restrictive Covenant restricts any activity that may interfere with cleanup actions, removal, or use of groundwater from any well on the property and has deed transfer and lease restrictions (EPA 2019).

Several medium-risk hazardous materials sites were identified within the study area for the Midway Landfill Alternative. None of these sites would be full acquisitions for this alternative. Additionally, no remedial action would be expected if these properties were partially acquired or used as temporary construction easements for the project.

Historical Aerial Review

Historical aerial photographs of the Midway Landfill Alternative study area were obtained from EDR and compiled in the EDR Aerial Photo Decade Package. Aerial photographs were examined for the years 1943, 1957, 1968, 1972, 1980, 1990, 2006, 2009, 2013, and 2017. Observations are listed below.

- 1943: The area appears to be mostly undeveloped, surrounded in all directions by undeveloped, partially wooded land. Some rural residential properties are visible in the area. SR 99 is apparent to the west, Military Road is partially developed to the east, S 259th Place is developed to the south, and S 240th Street is developed to the north.
- 1957: The site appears to be an active gravel quarry. Commercial development is visible to the north, south, and west. Some residential development is visible to the far northeast.
- 1968–1980: The Midway Landfill appears to be operational (landfill operations began in 1966). I-5 is visible to the east. Development immediately to the southwest is visible. Residential and commercial development is apparent in all directions from the site.

- 1990: Landfill operations ceased in 1983, and the site was listed as an EPA Superfund site. The 1990 aerial photograph shows remedial efforts underway, including a stormwater detention pond to the north of the landfill to collect surface runoff. The surrounding area appears relatively unchanged since the 1980 aerial photograph.
- 2006–2017: The Midway Landfill appears to be filled and capped according to reported remedial efforts. The surrounding area appears to be developed similar to current conditions, with commercial, industrial, and residential development to the east, south, west, and north of the landfill.

3.13.1.2 South 336th Street Alternative

Regulatory Database Review

There were no high-risk hazardous materials sites identified for the South 336th Street Alternative.

Several medium-risk hazardous materials sites were identified for the South 336th Street Alternative based on their listing in regulatory databases. Two of these sites (Conoco Phillips Site 2705483 at 2535 S 320th Street and the property at 1910 South 344th Place) are not properties that would be acquired. One medium-risk site is the Belmor Park Golf & Country Club (2101 S 324th Street) and is a partial acquisition for the South 336th Street Alternative at the northern portion of the mainline tracks. Gasoline-contaminated soil associated with a leaking underground storage tank was remediated and the site was issued a No Further Action determination by Ecology. No remedial action would be expected if the property were partially acquired.

Two additional medium-risk sites are full or partial acquisitions for the South 336th Street Alternative:

- The Bryan Property (1908 S 341st Place), also listed as Abra Auto Body & Glass Federal Way, is a site currently operating as an automotive repair shop since at least 2001 and would be a partial acquisition for this alternative. After numerous violations during environmental inspections, surface water, soil, and sediment samples were taken, and elevated levels of petroleum hydrocarbons and metals were found. The site entered the Ecology Voluntary Cleanup Program in 2013. Ecology has stated that there is no soil-to-groundwater pathway. Remedial activities on the property have been ongoing and a request for a No Further Action Determination was made by the property owner in 2019. Ecology has stated that if cleanup is completed as planned, no further remedial action will be required at the site. If acquired, there could be some additional remedial action; however, based on the cleanup already conducted at the site, the remedial action is not expected to be extensive.
- The Lloyd Enterprises, Inc site (2102 S 341st Place) was a former composting facility with several underground storage tanks onsite and is a full acquisition for this alternative. All underground storage tanks have been removed, and the facility has been closed. No indication of release from the underground storage tanks was found. A small lube/motor oil spill (approximately 10 gallons) was reported in 2016; however, this incident has been closed and did not require listing in a large cleanup database. No remedial actions are expected if the property is acquired.

Historical Aerial Review

Historical aerial photographs of the South 336th Street Alternative area were obtained from EDR and compiled in the EDR Aerial Photo Decade Package. Aerial photographs were examined for the years 1941, 1943, 1957, 1968, 1972, 1980, 1990, 2006, 2009, 2013, and 2017. Observations are listed below.

- 1941–1943: The area appears to be mostly undeveloped, wooded land surrounded in all directions by undeveloped, partially wooded land. North Lake is visible to the far northeast of the site. Some rural residential properties are visible in the area. SR 99 is developed to the west, S 344th Street is developed to the south, and S 336th Street is developed to the north.
- 1957: A small residence or commercial building is located immediately to the southwest of the site. SR 18 is visible to the south of the site.
- 1968–1972: Some commercial and industrial development is visible to the north and west of the site. I-5 is visible to the east of the site. Development immediately to the southwest is visible. Residential and commercial development is visible in all directions from the site. Botanical gardens are visible to the far east of the site.
- 1980–1990: The site remains undeveloped, wooded land. Commercial development is visible immediately to the north, west, and south of the site.
- 2006–2017: The Christian Faith Center and Pacific Christian Academy building and associated parking lots are developed on the site. The surrounding area appears to be developed similarly to current conditions, with commercial, industrial, and residential development to the east, south, west, and north of the site.

3.13.1.3 South 344th Street Alternative

Regulatory Database Review

There were no high-risk hazardous materials sites identified for the South 344th Street Alternative.

Several medium-risk hazardous materials sites were identified for the South 344th Street Alternative based on their listing in regulatory databases. One of these sites (Conoco Phillips Site 2705483 at 2535 S 320th Street) is not a property that would be acquired. One medium-risk site is Belmor (2101 S 324th Street) and is a partial acquisition for the South 344th Street Alternative, at the northern portion of the mainline tracks. Gasoline-contaminated soil associated with a leaking underground storage tank was remediated, and the site was issued a No Further Action determination by Ecology. No remedial action would be expected if the property were partially acquired.

Three additional medium-risk sites are full acquisitions for the South 344th Street Alternative. The Bryan Property and the Lloyd Enterprises site (partial and full acquisitions, respectively, for the South 336th Street Alternative) are described above in Section 3.13.1.2. The third site is the property at 1910 S 344th Street. This site has one operational underground storage tank and some violations of compliance. A surface petroleum spill is listed in 2003, though it is not related to the underground storage tank. Formal administrative compliance violations have been listed for the property; however, no remedial actions are expected if the property is acquired.

Historical Aerial Review

Historical aerial photographs of the South 344th Street Alternative area were obtained from EDR and compiled in the EDR Aerial Photo Decade Package. Aerial photographs were examined for the years 1941, 1943, 1957, 1968, 1972, 1980, 1990, 2006, 2009, 2013, and 2017. Observations are listed below.

- 1941–1957: The site appears to be rural residential property on the southern portion and undeveloped, wooded land on the northern portion, surrounded in all directions by undeveloped, partially wooded land. North Lake is visible to the far northeast of the site. Some rural residential properties are visible in the area. SR 99 is developed to the west, S 344th Street is developed to the south, and S 336th Street is developed to the north.
- 1968–1972: Additional residential development is visible on the site. Some commercial and industrial development is visible to the north and west of the site. I-5 is visible to the east of the site. Development immediately to the northwest is visible. Residential and commercial development is visible in all directions from the site. Botanical gardens are visible to the far east of the site.
- 1980: The eastern portion of the site appears to be cleared and primed for development. Commercial development is visible immediately to the west and northwest of the site. The surrounding area to the far north, west, and south is developed with commercial, industrial, and residential properties.
- 1990: Commercial development is visible on the site, with several buildings and associated parking lots as well as land cleared for development.
- 2006–2017: The site appears to be developed similarly to current conditions, with multiple commercial buildings and parking lots, including a sports center, an RV storage center, and a church. The adjacent property to the north is developed with the Christian Faith Center and Pacific Christian Academy and associated parking lot. The surrounding area appears to be developed similar to current conditions, as well, with commercial, industrial, and residential development to the east, south, west, and north of the site.

3.13.2 Environmental Impacts

Potential impacts discussed in the following sections are from known contaminated sites and are based on the hazardous materials site's location relative to the build alternatives, focusing on hazardous materials sites within the 1/8-mile study areas. Hazardous materials sites within this distance to the build alternatives have a higher probability of affecting implementation of the proposed project. Sites that pose a high risk to the build alternatives could also have long-term impacts if remediation actions are necessary after project construction.

3.13.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to hazardous materials from construction or operation of OMF South would not occur. However, hazardous materials could be disturbed during the construction of FWLE, which crosses the Midway Landfill, a Superfund site. Sound Transit has completed the regulatory process and initiated construction across the site. Other planned projects in the area could have hazardous materials impacts, depending on their location and past use of their respective properties. Because TDLE would open after OMF South, impacts associated with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are

addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

3.13.2.2 Long-Term Impacts

After construction, an OMF could cause long-term impacts to the environment if an accidental release of hazardous materials, such as a fuel spill, occurs. Light rail trains operate on electricity and not fuel; however, storage of hazardous materials at the OMF is likely, and minor accidental releases could result during maintenance activities. The proposed OMF South would have a painting area for the trains and would need to register as an applicator with the Puget Sound Clean Air Agency.

Midway Landfill Alternative

Vapor intrusion testing would continue to be required to ensure that any occupant of the OMF South facility would not be exposed to harmful gases associated with the former landfill. Long-term exposure to even low levels of certain gases can increase the risk of chronic health issues; in extreme cases, the buildup of gases from sources such as landfills can cause acute health effects and may pose immediate risks of fire or explosion (EPA 2008).

The Midway Landfill Human Health Risk Assessment (Appendix D4) details the risks to human health associated with the Midway Landfill Alternative. The report describes the contaminants of interest and the scenarios of potential exposure to these contaminants for OMF South employees. Exposure to vapors from landfill gas would be a complete route of exposure to workers under the worst-case scenario; in other words, if engineering controls fail, vapor could intrude into indoor air. Vapor intrusion from contaminants in groundwater is not expected to adversely impact OMF South employees.

There is a high level of uncertainty regarding risks of landfill gases at the site based on the lack of sufficient data to fully characterize human health risks. The Human Health Risk Assessment recommends that additional testing of landfill gases, based on probable paths of occupational exposure, be completed to fill in these data gaps and identify other potential routes of exposure. In addition to toxicological considerations, uncontrolled release of methane gas from the landfill could pose an explosion hazard risk because the OMF South building (including below-grade pits) would have electrical equipment and live electrical overhead catenary wires that could spark or emit stray currents.

South 336th Street Alternative

There are no known long-term impacts associated with hazardous materials unique to the South 336th Street Alternative.

South 344th Street Alternative

There are no known long-term impacts associated with hazardous materials unique to the South 344th Street Alternative.

3.13.2.3 Construction Impacts

The hazardous materials analysis also considered direct impacts of activities associated with the construction of OMF South. The analysis considered the impacts to human health and the environment as a result of possible release of contaminants or alteration of contaminant

migration pathways during construction activities and considered the effects of existing contaminated sites.

Midway Landfill Alternative

The Midway Landfill is a high-risk hazardous materials site listed and managed as a Superfund site. Redevelopment of a property formerly used as a landfill and subject to ongoing Cleanup Action Plan and Record of Decision requirements is considered high risk for several reasons. There are potential structural challenges (foundation design and alignment of underground utilities) and environmental challenges (hazardous materials disposal; air, soil, and groundwater contamination; and rebuilding a vapor extraction system to manage risk of gas intrusion into human-occupied spaces).

Temporary impacts from construction on the Midway Landfill could include the potential release of contaminated air, soil, and groundwater. Substantial remediation, cleanup, and proper disposal of any excavated materials during construction, as well as air and groundwater monitoring in the surrounding area would be necessary. Any of the subsurface construction design options for the Midway Landfill would require Ecology and/or EPA approval to amend the existing Cleanup Action Plan and Record of Decision to confirm that the project would maintain the commitments currently in place for the landfill, including handling and disposal of excavated materials, worker health and safety, and related monitoring.

Subsurface Construction Design Options

The three subsurface construction design options for the Midway Landfill Alternative range from a structural platform with minimal excavation to a full excavation of the landfill with backfilling of competent soils.

All excavation (and installation of drilled shafts) would require the modification of the landfill gas management system and could include the exposure of workers to methane and other compounds generated by breakdown of landfill materials. The shaft drilling also presents the possibility for creating additional pathways for the downward migration of contaminants contained in leachate to the aquifer below. Section 3.11, Water Resources, considers the potential impacts to groundwater and the need for substantial remediation during construction. Remediation measures include cleanup and proper disposal of excavated materials to minimize contamination as well as groundwater monitoring in the surrounding area, with the possibility of replacing or rehabilitating the landfill membrane.

The excavation of landfill materials also has the potential to expose construction workers to contaminated materials and contaminated groundwater as well as the potential to encounter characteristic hazardous wastes. The subsurface construction design options with more substantial excavation would prolong and presumably increase these exposure risks. Additionally, the excavated material could potentially be flammable. Construction crews would need to be equipped with fire extinguishing tools and equipment.

The transport of these contaminated landfill materials (and potentially hazardous wastes) via roadway and rail also presents a risk to the public in the case of a spill. These risks would increase with the volume of materials excavated and transported. Loads of landfill materials leaving the project area would be required to be covered per a project-specific contaminated media management plan.

From a beneficial impact standpoint, excavation of contaminated landfill materials from the Midway Landfill has the potential to improve local groundwater quality through reduced contact with contaminants and the potential for reduced infiltration. Any removal of the cap portion of the landfill presents the opportunity to potentially improve the cap and membrane and the landfill gas management system. The Midway Landfill is not lined and therefore there is no barrier to prevent mixing of leachate and groundwater. The benefit of fully excavating and hauling contaminated residuals from the Midway Landfill to a lined landfill located elsewhere would be the reduced potential for groundwater contamination.

South 336th Street Alternative

No high-risk hazardous materials sites are located within the South 336th Street Alternative. Based on regulatory status, acquisition level (full, partial, or no impact), or distance from the parcels being acquired, low and medium-risk sites would not likely affect this alternative during construction.

South 344th Street Alternative

No high-risk hazardous materials sites are located within the South 344th Street Alternative. Based on regulatory status, acquisition level (full, partial, or no impact), or distance from the parcels being acquired, low- and medium-risk sites would not likely affect this alternative during construction.

3.13.2.4 Avoidance and Minimization of Impacts

Unexpected residual soil and groundwater contamination may be encountered during construction activities in portions of the South 336th Street or South 344th Street alternatives. To mitigate potential impacts from all potential hazardous material sites, Sound Transit would perform a level of environmental due diligence appropriate to the size and presumed past use at any properties in the study area before they are acquired. Sound Transit may seek certain legal protections as part of the real property acquisition process to reduce its legal and financial risk.

Construction of the Midway Landfill Alternative would encounter known areas of contamination and affect portions of the remedy currently in place for the site, including a low permeability cap, landfill gas collection system, surface water management system, and groundwater monitoring system. As a result, any of the subsurface construction design options for the Midway Landfill would require Ecology and/or EPA approval to amend the existing Cleanup Action Plan and Record of Decision to confirm that the project would maintain the commitments currently in place for the landfill, including protection against short-term impacts during construction and long-term impacts after construction.

The medium-risk sites identified for the three alternatives have been well characterized and would likely require no additional investigation and little or no remediation expected in addition to what has been completed. To the extent practicable, Sound Transit would limit construction activities that might encounter contaminated groundwater or soil at these sites.

Based on the due diligence process, plans for the mitigation, handling, and disposal of contaminated media and hazardous construction debris would be developed on a site-by-site basis in conjunction with the appropriate regulatory agencies. A project-wide contaminated media management plan may also be developed and implemented.

Additionally, hazardous substances and petroleum products used during construction, such as fuels, paints, solvents, and other chemicals, would be managed and stored per the contractor's pollution control plan. BMPs would be followed in order to reduce the risk of spills, leaks, or other releases during construction activities. These BMPs could include:

- Keep fueling, maintenance, and cleaning in contained areas (berms, etc.)
- Minimize the production or generation of hazardous materials
- Appropriately label and store hazardous waste, per federal regulations
- Designate hazardous waste storage away from storm drains or surface water
- Recycle materials (used oil- and water-based paint) as appropriate
- Handle any potential spills of hazardous materials in conformance with applicable Material Safety Data Sheets

The current construction schedule assumes restrictions on excavation into the Midway Landfill during the wet season — October 1 through April 31. This would reduce the amount of precipitation that could come in contact with the exposed refuse, which then could become contaminated water that could contribute to the contaminated groundwater at the site.

3.13.2.5 Indirect Impacts

No indirect impacts related to hazardous materials would result from construction and operation of the proposed project.

3.13.3 Potential Mitigation Measures

Mitigation measures for the three subsurface construction design options for the Midway Landfill Alternative would vary depending on the option chosen. Common to the three subsurface construction design options would be the replacement of the landfill cap to prevent surface water and stormwater from entering any remaining portion of landfill. Replacement or upgrade of the landfill gas extraction system and the continuation of the landfill gas monitoring system would be required for the Platform and Hybrid options and may be required for the Full Excavation option.

3.14 Public Services

This section discusses how public services could be affected by the OMF South project alternatives. The study area is the area 0.5 mile from the potential construction limits of each build alternative, including the OMF site and mainline, lead, and tail tracks. The study areas are within the jurisdictions of Des Moines, Kent, and Federal Way and include portions of unincorporated King County.

The public services analysis was conducted by reviewing design drawings and construction documentation to identify what could cause changes in response times for emergency services (fire, medical, and police), travel times for school bus and solid waste collection routes, and overall demand for public services. Acquisition and displacement data were also reviewed to see whether any public services facilities would be acquired or whether emergency access would be interrupted.

In addition, analyses completed for other elements of the environment for the OMF South project, including those in Section 3.2, Transportation; Section 3.3, Acquisitions, Displacements, and Relocations; and Section 3.15, Utilities, Energy, and Electromagnetic Fields, were reviewed to assess potential impacts to public services.

There are no relevant regulatory requirements related to public services.

3.14.1 Affected Environment

3.14.1.1 Midway Landfill Alternative

The following summarizes the public services in the Midway Landfill Alternative study area (Figure 3.14-1).

Fire and Emergency Medical

The Puget Sound Regional Fire Authority (Puget Sound Fire) provides emergency management services covering approximately 109 square miles, including the cities of Kent, Covington, Maple Valley, and SeaTac, as well as portions of unincorporated King County. The coverage area within the city of Kent is 34 square miles, the entire jurisdictional boundary.

Puget Sound Fire provides emergency response service from 13 fire stations, none of which are within the project study area. The department employs a total of 326 personnel, of whom 258 are uniformed, with a minimum of 54 firefighters and emergency medical technicians on duty 24 hours a day, 7 days a week. Fire Station 73, used as both a fire station and police substation, is the closest facility to the study area, located approximately 1 mile to the southeast on Military Road S in Kent. According to Puget Sound Fire's 2018 Annual Report, they met their response performance goal for the first emergency medical services to be on the scene in 7 minutes and 30 seconds about 85 percent of the time, and met their response performance goal for the first fire unit to be on the scene in 7 minutes and 40 seconds approximately 75 percent of the time (Puget Sound Fire 2018).

King County's Medic One program provides advanced life-support services, and Valley Communications Center provides 9-1-1 dispatch services. Puget Sound Fire is also partnered with King County Emergency Management for emergency response to larger-scale emergency alerts, such as earthquakes or floods. There are no hospitals or emergency medical facilities in the study area.

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE 3.14-1
Public Services, Safety, and Security
Midway Landfill Alternative

OMF South

Although the public services study area includes a portion of Des Moines, the build alternative itself is outside the city limits. Puget Sound Fire would respond to incidents at OMF South if it were constructed at the Midway Landfill.

Police

The Kent Police Department provides law enforcement within the city limits of Kent. The department has 152 uniformed police officers and 48 support staff. In 2018, the average response time for Priority E emergencies (confirmed emergency — extensive loss of life and/or property) was 4 minutes and 85 seconds, and the average response time for Priority 1 emergencies (potential emergency — could result in loss of life and/or property) was 5 minutes and 45 seconds (Valley Communications Center 2018). No police stations are within the project study area.

The Kent Police Department would respond to incidents at OMF South if the Midway Landfill Alternative was selected to be built. However, a multi-jurisdictional interlocal agreement is in place for law enforcement to join forces to handle specific serious criminal confrontations. This agreement includes the Port of Seattle and the municipalities of Auburn, Kent, Renton, Tukwila, and Des Moines.

The cities of Kent and Des Moines are served by the Washington State Patrol Field Operations Bureau District 2, which comprises all of King County. District 2 patrols state and interstate highways within the county, including SR 99 and I-5. The Field Operations Bureau is responsible for traffic law enforcement, collision investigation, criminal interdiction, terrorism prevention, and motorist assistance (WSP 2019).

Solid Waste and Recycling

Garbage collection in the study area is largely provided by a city-authorized contracted hauler, as mandated for occupied commercial and residential properties. All nonhazardous solid waste is taken directly to King County's Cedar Hills Landfill in Maple Valley or to a solid waste transfer station (the nearest transfer station is the Bow Lake Transfer Station in Tukwila). The closest facility that accepts household hazardous waste is the South Transfer Station in Seattle, managed by SPU. A King County-operated "Wastemobile" travels to many communities to provide residents a place to take their household hazardous waste periodically. Kent Fire Station 75, located approximately 10 miles from the study area, is the closest household hazardous waste depository.

School Districts/Schools

The Midway Landfill Alternative study area includes three schools, shown on Figure 3.14-1 and listed below. The elementary school enrollment is provided by the Washington Office of Superintendent of Public Instruction (OSPI 2019). Highline College enrollment information was found on the college website (Highline College 2019).

- Sunnycrest Elementary School (24629 42nd Avenue S): Federal Way School District; 594 students enrolled in 2018/2019
- Parkside Elementary (2104 S 247th Street): Highline School District; 630 students enrolled in 2018/2019
- Highline College (2400 S 240th Street): approximately 17,000 students enrolled in 2018/2019

Other Public Services

The study area also includes a Washington Army National Guard location and the Sea Mar Community Health Center (Figure 3.14-1). The Washington Army National Guard is located east of I-5, at 24410 Military Road S in Kent, and serves as an armory. Sea Mar Community Health Center, located at 2781 S 242nd Street in Des Moines, provides family medicine and dentistry, behavioral health, maternity support, and a pharmacy. It is a community-based organization focused on health and social services to underserved communities.

3.14.1.2 South 336th Street and South 344th Street Alternatives

The public services are primarily the same for these two build alternatives, except for the Federal Way Public Academy, the United States Postal Service distribution center, and the Federal Way Veterans Affairs Clinic (Valor Healthcare), which are only in the South 344th Street Alternative study area (Figure 3.14-2).

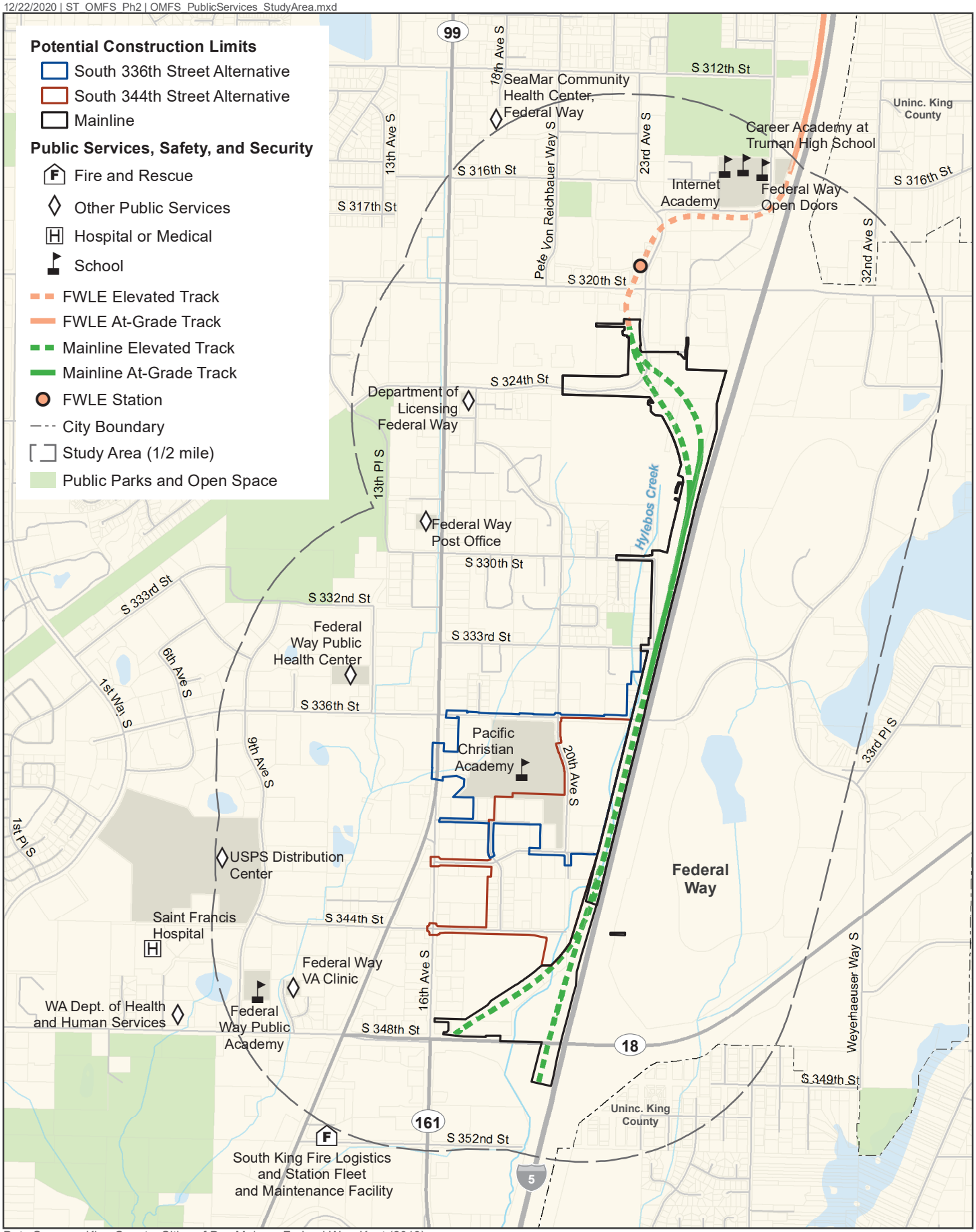
Fire and Emergency Medical

South King Fire and Rescue (South King Fire) provides emergency management services covering approximately 41 square miles, including the cities of Des Moines and Federal Way and a portion of unincorporated King County. Facilities include seven fire stations and one training and maintenance station. The department employs 175 personnel, of whom 151 are uniformed officers, with a minimum of 29 firefighters and emergency medical technicians on duty 24 hours a day, 7 days a week (South King Fire 2018). South King Fire is constructing a logistics and station fleet and facilities maintenance facility at 1351 S 351st Street within the southern portion of the study area. They also have plans to build an emergency response fire station at 35100 Pacific Highway S, just outside the study area, directly west of the new logistics and station fleet and facilities maintenance facility.

No existing fire stations are within the study area. Fire Stations 61, 62, and 64 are the closest facilities, all less than 2 miles from the site. South King Fire is also teamed with King County's Medic One Program, and Valley Communications Center provides 9-1-1 dispatch services. According to South King Fire's 2018 Performance Report, they met their response performance goal for the first emergency medical services to be on the scene in 6 minutes about 82 percent of the time. They met their response performance goal for the first fire unit to be on the scene in 5 minutes and 30 seconds approximately 85 percent of the time (South King Fire 2018).

South King Fire is also partnered with Federal Way Emergency Management for emergency response to larger-scale emergency alerts, such as earthquakes or floods.

Saint Francis Hospital is located outside of the study areas to the southwest of both alternatives. It is a full-service hospital that provides diagnostic imaging and radiology; emergency services; a full range of women's health services, including a birth center; and radiation oncology. Although it is outside the build alternative study areas, it is the closest emergency room.



Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE 3.14-2
Public Services, Safety, and Security
South 336th Street and South 344th Street Alternatives

OMF South

Police

The Federal Way Police Department provides law enforcement within the city limits. The department has 134 uniformed personnel and 19 civilian staff. In 2018, the average response time for Priority E emergencies was 4 minutes and 30 seconds, and the average response time for Priority 1 emergencies was 5 minutes and 59 seconds (City of Federal Way 2019). The closest police station is located at 33325 8th Avenue S, just outside the study area.

Federal Way is served by the Washington State Patrol Field Operations Bureau District 2, which comprises all of King County. District 2 patrols interstate and state highways within the county, including I-5 and SR 99. The Field Operations Bureau is responsible for traffic law enforcement, collision investigation, criminal interdiction, terrorism prevention, and motorist assistance (WSP 2019).

Solid Waste and Recycling

Garbage collection in the study area is provided by a city-authorized contracted hauler for occupied commercial and residential properties. All nonhazardous solid waste collected in the study area is taken directly to King County's Cedar Hills Landfill in Maple Valley or a nearby solid waste transfer station (the nearest is the Algona Transfer Station). The closest facility that accepts household hazardous waste is the South Transfer Station in Seattle, managed by SPU. A King County-operated "Wastemobile" travels to many communities in King County to provide residents a place to take their household hazardous waste periodically. The closest depository for household hazardous waste is located approximately 3 miles from the study area in the parking lot of the Outlet Collection in Auburn at the intersection of SR 167 and SR 18.

School Districts/Schools

The study area includes five schools, shown in Figure 3.14-2:

- Federal Way Open Doors (31455 28th Avenue S): Federal Way School District; 268 students enrolled in 2018/2019
- Federal Way Public Academy (34620 9th Avenue S): Federal Way School District; 312 students enrolled in 2018/2019 (South 344th Street Alternative only)
- Internet Academy (31455 28th Avenue S): Federal Way School District; 254 students enrolled in 2018/2019
- Pacific Christian Academy (33645 20th Avenue S): private school associated with the Christian Faith Center; 312 students enrolled in 2018/2019
- Career Academy at Truman High School (31455 28th Avenue S); Federal Way School District; 85 students enrolled in 2018/2019

Other Public Services

Other public services within the study area (Figure 3.14-2) include:

- Federal Way Department of Licensing (1617 S 324th Street)
- Federal Way Public Health Center (33431 13th Place S): The center provides health care for children with special needs, family planning, health insurance enrollment, HIV screening, pregnancy testing, teen services, and Women, Infants, and Children services

- Sea Mar Community Health Center (31405 18th Avenue S): The center provides family medicine and dentistry, behavioral health, maternity support, and a pharmacy; it is a community-based organization focused on health and social services to underserved communities
- Valor Healthcare (34617 11th Place S): The Federal Way VA Clinic provides primary care, mental health services, nursing, and social work to veterans of the armed services (South 344th Street Alternative only)
- United States Postal Service distribution center (34301 9th Avenue S) and Federal Way Post Office (32829 Pacific Highway S; South 344th Street Alternative only)

3.14.2 Environmental Impacts

3.14.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to public services from construction or operation of OMF South would not occur. FWLE will not result in adverse impacts on public services because it is grade-separated from traffic and will not affect travel and response times. Other projects planned to be constructed within the alternatives' study areas could have impacts to public services, depending on their design. Because TDLE would open after OMF South, impacts associated with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

3.14.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

The build alternatives would not increase the population of workers or residents within the study areas in such a way that would create an increased demand for public services. Therefore, impacts related to access interruption and increased public services demand during operation would not occur.

Increased demand for police services would not occur. Security measures for each alternative would be similar to other Sound Transit OMFs. Measures would include on-site security personnel, perimeter fencing, electronically controlled gates, and security patrol in the evenings, from 5 p.m. to 5 a.m., 7 days a week. Emergency access to the mainline (as applicable) and OMF site for fire, emergency medical, and police personnel would be provided.

No long-term impacts on school bus and solid waste/recycling collection routes would occur under any of the build alternatives. OMF South operations would produce solid waste and recycling. Maintenance operations would also produce hazardous waste due to the use of lubricants, solvents, and the like. Hazardous waste would be managed according to all applicable regulations and requirements.

Midway Landfill Alternative

Impacts under the Midway Landfill Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives. There would be no anticipated adverse impacts to public services.

South 336th Street Alternative

Except as discussed below, there would be no anticipated adverse impacts to public services associated with the South 336th Street Alternative OMF site. This alternative would not result in adverse impacts on public services in the vicinity of the mainline. No parcels containing public service facilities would be acquired for the construction or operation of the mainline and lead tracks, and the tracks are designed to be elevated above all roadway intersections. Therefore, there would be minimal effects on travel or response times for public service vehicles, including fire, emergency medical, and police.

Construction and operation of the South 336th Street Alternative would require the full acquisition of the Christian Faith Center campus, which houses the Pacific Christian Academy. If the facility is relocated, some students would likely have to travel farther to school. If the school discontinues operations, the approximately 312 students would either need to enroll in another private school or enter the public school system.

This alternative would require the closure of 20th Avenue S between S 336th Street and S 341st Place. Because 20th Avenue S is used as an alternative route for serving properties within and to the south of the build alternative, fire, police, and emergency response access would be changed.

Existing travel times from the South King Fire and Rescue Station 64 located near S 320th Street and Military Road S are about 5 to 6 minutes, based on Google Maps travel times during periods without congestion. If 20th Avenue S is closed, emergency vehicles would likely divert their trip to continue along S 336th Street to turn left on SR 99, turn left on 16th Avenue S, and then left onto S 341st Place. This alternative route would require about 7 minutes of travel time. The increase in response time would be approximately 1 to 2 minutes.

From 2015 through 2019, South King Fire reported 248 emergency calls to properties they serve south of the Christian Faith Center campus, which required them to use 20th Avenue S within the study area. Of the 248 emergency calls, 56 were false alarms and 157 were related to emergency medical services and fires. The remaining calls included public assistance (9), “good intent” (23), and hazardous materials (3). In response to the closure, South King Fire would shift first response from Station 64, which is located north of the build alternative, to Station 61, located south of the build alternative. With suitable options for emergency access, the ability to shift first-response service boundaries, and a planned future fire station, South King Fire considers the closure of 20th Avenue S to have minimal impact on fire and emergency medical services (South King Fire 2020).

The city of Federal Way reported that all parcels surrounding 20th Avenue S are served by their police department. Data regarding the number and type of calls routed through 20th Avenue S are not available (City of Federal Way 2020). Between January 1 and December 31, 2019, Community Crime Map shows 47 crimes reported within the study area south of the Christian Faith Center. The majority (36) of the crimes reported are burglary and theft (LexisNexis Risk Solutions 2020).

The city of Federal Way has expressed concern over the potential effects that the closure of 20th Avenue S could have on police response time. Because police officers are often traveling on patrol and not dispatching from a central location to respond to calls, it is not possible to accurately determine how the road closure would affect their response time. The majority of Federal Way is located west of the project site. With the South 336th Street Alternative located toward the eastern edge of the city limits, police patrol vehicles would likely be either north, south, or west of 20th Avenue S most of the day; thus, the closure would likely have very little impact on their response time to the area currently served by 20th Avenue S. Further, some of the businesses and residences served by 20th Avenue S would be acquired for the project, reducing the number of properties needing emergency services in the immediate area.

The closest hospital to the South 336th Street Alternative is St. Francis Hospital, at S 345th Street and 9th Avenue S. Because the hospital is southwest of the project site, emergency vehicle response times would not be affected by the closure of 20th Street S.

South 344th Street Alternative

There would be no anticipated adverse impacts to public services associated with the South 344th Street Alternative OMF site. Additionally, this alternative would not result in adverse impacts on public services in the vicinity of the mainline. No parcels containing public service facilities would be acquired for the construction or operation of the mainline and lead tracks, and these components of the alternative are elevated above all roadway intersections. Therefore, there would be minimal effects on travel or response times for public service vehicles, including fire, emergency medical, and police.

Approximately 19 acres of the Christian Faith Center's property east of 20th Avenue S would be acquired for the South 344th Street Alternative OMF site. Permanent acquisition would reduce parking and limit recreational opportunities on the campus. In addition, the presence of OMF South would be visible from portions of the school property, but at about 1,000 feet from the school building. This would not affect school uses or school operations.

Similar to the South 336th Street Alternative, this alternative would close 20th Avenue S between S 336th Street and S 341st Place. Impacts to emergency response times would be similar to those described above for the South 336th Street Alternative.

3.14.2.3 Construction Impacts

Impacts Common to All Build Alternatives

Implementation of any of the build alternatives would temporarily affect the roadways in the study area and vicinity, resulting in short-term impacts on emergency services. Construction vehicles would temporarily increase traffic congestion. The Midway Landfill Alternative, with its relatively long construction schedule and large number of truck trips, would potentially have the largest effect on emergency service response times and public service delivery. Sound Transit would coordinate with potentially affected public service providers before and during construction to minimize delays in emergency response times and disturbance to school bus and solid waste collection routes.

3.14.2.4 Avoidance and Minimization of Impacts

The OMF South alternatives would be designed within a framework of standards that address emergency, safety, and security at each facility. Operations at OMF South would be performed in accordance with a facility operations plan that would ensure safety and security at the site. Sound Transit would also work with the local jurisdictions to develop an emergency response, safety, and security plan.

As discussed in Section 3.2, Transportation, construction-related traffic impacts would be addressed with implementation of a construction transportation management plan prepared through coordination with the affected jurisdiction. Sound Transit would coordinate with potentially affected public service providers before and during construction to minimize delays in emergency response times and minimize disturbance to school bus and solid waste collection routes. For the South 336th Street and South 344th Street alternatives, public service provision could be affected primarily through the closure of 20th Avenue S. Sound Transit would work with Federal Way to develop measures to address this concern.

3.14.2.5 Indirect Impacts

The OMF South build alternatives could have indirect impacts to their respective study areas, including changes in development patterns which could affect the need for public services. Section 3.4, Land Use, contains a more detailed description of direct and indirect land use changes in addition to development potential consistent with local and regional policies and plans.

3.14.3 Potential Mitigation Measures

No public services mitigation would be required during operation or construction of OMF South.

3.15 Utilities, Energy, and Electromagnetic Fields

This section describes the affected environment, potential adverse impacts, and mitigation measures for utilities, energy, and electromagnetic fields (EMFs). Analysis of these elements of the environment have been combined into one section because adverse impacts from construction and operation of the OMF South project alternatives are not expected.

Utilities

The study area for the utility analysis is the area within the potential construction limits of the build alternatives, including the lead tracks and the mainline track necessary for the South 336th Street and South 344th Street alternatives. Information on relocated or protected utility lines was compiled from several sources, including geographic information system (GIS) data from Sound Transit and the cities of Kent and Federal Way, utility maps, and as-built drawings obtained from private and public utility companies.

Major utilities are:

- Water mains of 16-inch diameter or greater
- Stormwater drains and sanitary sewers of 36-inch diameter or greater
- Sanitary sewer force mains of 24-inch diameter or greater
- 115 kilovolt (kV) and greater electrical transmission lines
- High-pressure gas mains of any diameter
- Intermediate-pressure gas lines with an 8-inch diameter or greater
- Telephone and fiber-optic duct banks with three or more conduits
- Petroleum product pipelines

Utilities within the study area are regulated by local policies and procedures for the cities of Kent and Federal Way, Highline Water, Midway Sewer, and Lakehaven Water and Sewer districts.

Energy

The study area for the energy analysis is the area within the potential construction limits of the build alternatives. The context and intensity of net energy consumption associated with construction and operation of OMF South, relative to the No-Build Alternative, were evaluated to determine the potential for adverse impacts on energy resources.

In 2017, Washington consumed 2,097 trillion British thermal units (Btu) of energy. Transportation accounts for 32 percent of energy consumption in Washington, followed by the industrial (26 percent), residential (24 percent), and commercial sectors (18 percent).

Per capita energy consumption, in general, is declining due to improvements in energy efficiency and design as well as the decline in industrial energy consumption (Washington State Department of Commerce 2018). Despite this reduction in per capita energy use, the state's overall energy consumption is expected to increase over the next several decades due to growth in population, jobs, and demand for vehicle travel (Washington State Department of Commerce 2011). Increased demand for energy is closely tied to energy prices; if prices remain high, the growth in energy demand may be moderated by consumers who purchase fuel-efficient vehicles or change personal consumption habits (Washington State Department of Commerce 2018).

Although no laws have been adopted to regulate energy consumption and there are no thresholds for evaluating energy-related impacts from construction or operational activities, many federal, state, and local plans and policies identify goals for the efficient use of energy. These goals include increasing traffic efficiency and building energy efficiency to reduce energy consumption.

In addition, Sound Transit's Sustainability Plan, most recently updated in 2019, commits Sound Transit to integrating efficient operating practices at existing and new facilities, using energy-saving equipment to reduce energy demand, and maximizing intermodal transit connections to reduce automobile travel (Sound Transit 2019d). The 2019 update includes goals focused on sustainable building and infrastructure and opportunities for transit oriented development.

Electromagnetic Fields

The EMF study area is the area immediately adjacent (300 feet) to the potential construction limits of the build alternatives. Any sensitive equipment in this area might be affected by EMFs associated with building and operating the project. Facilities with equipment potentially sensitive to electromagnetic interference were identified in the study area using a review of existing facilities, buildings, and land uses.

Electrical systems produce both electric and magnetic fields. Electric fields result from the strength of the electric charge, while magnetic fields result from the motion of the charge or the movement of ferromagnetic (magnetized iron or steel) objects, such as cars, trucks, buses, trains, and LRVs. Together, these fields are referred to as EMFs. EMFs are present around all electrical equipment and facilities (including the electrical power lines and electrical equipment for that would be required for OMF South) and wherever electricity is used. EMFs generated by electrical equipment and facilities are invisible, nonionizing, low-frequency radiation.

Electromagnetic interference occurs when the EMFs produced by a source interfere with the operations of an electrical, magnetic, or electromagnetic device, resulting in disruptions and possibly malfunctions in sensitive equipment. In certain situations, with sufficiently high exposure, EMFs can also result in adverse effects on human health, such as shocks or burns caused by touching objects that conduct electricity. The potential for electromagnetic interference and adverse human health effects depends on the location of EMF-sensitive receptors to the EMF source. In general, as for EMFs, electromagnetic interference and associated effects decrease with increasing distance from the source.

Concern over EMF exposure generally pertains to human-made sources of EMFs, such as power transmission lines and the electrical devices associated with OMF South. There are no federal, state, or local regulations or policies governing EMF exposure. However, EMF exposure guidelines have been developed for workers and the public by the International Commission on Non-Ionizing Radiation Protection, the American Conference of Governmental Industrial Hygienists, and the Institute of Electrical and Electronics Engineers. These guidelines address known human biological effects resulting from exposure of workers and the public to EMFs.

In electrical systems, such as Sound Transit's Link light rail system, current can flow from the system into nearby ground or concrete structures, resulting in "stray current." Stray current that travels through the ground or concrete structure to buried metallic structures, including utilities such as telephone cables, water pipes, electricity cables, and gas pipes, can cause corrosion that can result in damage, such as a leaking pipe or broken wire. Utility lines are typically insulated, and cathodic protection systems are used to prevent corrosion damage from stray currents.

3.15.1 Affected Environment

3.15.1.1 Utilities

Utility providers include municipal agencies, public utility districts, and private franchise utility companies. Table 3.15-1 summarizes the utility providers in the study area.

Table 3.15-1 Utility Providers in Study Area

Utility	Provider
Midway Landfill Alternative	
Gas	Puget Sound Energy
Electricity	Puget Sound Energy
Water	Highline Water District
Sewer	Midway Sewer District
Stormwater	Kent Public Works
Cable	Comcast
Communications	CenturyLink (Lumen), Zayo
South 336th Street and South 344th Street Alternatives	
Gas	Puget Sound Energy
Electricity	Puget Sound Energy
Water, Sewer	Lakehaven Water and Sewer District
Stormwater	Federal Way Public Works
Cable	Comcast
Communications	CenturyLink (Lumen), Zayo

3.15.1.2 Energy

This section discusses existing conditions related to energy use in the study area. Puget Sound Energy (PSE) provides both power and natural gas to the study area. Table 3.15-2 lists the number of customers and sales by energy type for PSE's service area, which is approximately 6,000 square miles (PSE 2019).

Table 3.15-2 2018 Utility Data for Puget Sound Energy

Utility Data	Electricity	Natural Gas
Number of Customers	1,142,797	830,547
Energy Sales	20,619,898 MWh	90,721 billion Btu[1]

Sources: PSE 2018a, 2018b

Note:

(1) Reported by PSE (2018b, 2019) as 907,205,189 therms and converted using the relationship 10 therms = 1 million British thermal units (Btu).

In addition to its own generation sources, PSE purchases additional energy through short-, medium-, and long-term contracts with other energy producers and suppliers. In 2017, coal represented 38 percent of PSE's electricity fuel mix, followed by hydropower (33 percent), natural gas (21 percent), wind (6 percent), nuclear (< 1 percent), and other (< 1 percent) (PSE 2019). However, as stated in Section 3.8, Air Quality and Greenhouse Gas Emissions, Sound Transit and

PSE have entered into an agreement that all electricity accounts related to the operations of Link light rail be sourced solely from renewable wind power via PSE's Green Direct program.

Natural gas is purchased by PSE for both electricity generation and delivery to customers. Future increases in electricity and natural gas sales are expected in the Puget Sound region. PSE's current base forecast for the next 20 years includes a 1.4 percent average annual growth rate for electricity and a 1.2 percent rate for natural gas (PSE 2017).

3.15.1.3 Electromagnetic Fields

Communities in the study area are served by a combination of overhead and buried electric distribution lines providing power to the existing commercial, industrial, and residential uses in the areas. There are also BPA 500 and 230 kV high-voltage transmission lines located just south of The Commons in Federal Way.

All electrical equipment and electronic devices generate EMFs. The widespread use of electricity in homes and businesses means that EMFs are present almost everywhere. Electric fields in the home, on average, range from 0 to 10 volts per meter, and electric fields directly beneath power lines may vary from a few volts per meter for some overhead distribution lines to several thousand volts per meter for extra-high-voltage power lines (NIEHS and NIH 2002).

EMF-sensitive receptors typically include hospitals and laboratories that use equipment that is sensitive to electromagnetic interference (e.g., magnetic resonance imaging [MRI] machines). Pipes and cable utilities commonly located under and along roadways can also be susceptible to stray currents.

Sound Transit did not identify any EMF-sensitive facilities, buildings, or land uses within the study areas of the build alternatives.

3.15.2 Environmental Impacts

3.15.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to utilities, energy, and from construction or operation of OMF South would not occur. FWLE would require utility relocations in the Midway study area, though no new electrical system capacity will be necessary. EMF impacts from the construction of FWLE are not expected. Other planned projects could require utility relocation, depending on their design. Because TDLE would open after OMF South, impacts associated with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

3.15.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Utilities

Operation of OMF South would result in a negligible increased demand for natural gas and for cable and communications systems.

Each build alternative would include an on-site traction power substation to power the LRVs for movement around the yard and transporting them back to the mainline. The daily power demand for tools and machinery in the vehicle maintenance shops, along with the storage yard lighting and other on-site electricity needs, would be supplied from the site's power service feed off the main local grid. The on-site traction power substation would be powered by 12.5 kV electric lines connecting to the nearest power pole. Increased electricity demand at OMF South may require additional distribution lines to be constructed and maintained by PSE. PSE may require additional energy resources to meet the increased demand. The specific needs would be determined during final design. The Energy discussion below contains more information.

For each of the build alternatives, water demand would increase, most of it for vehicle washing. A high percentage of this wash water would be recycled on site. The additional water demand would not greatly affect the water providers' existing and projected water supplies and would not likely compromise flow for fire protection. Water demand would be coordinated with fire departments and water suppliers to avoid impacts. The OMF South drainage system would be designed to filter and recycle a high percentage of the wash and rinse water. Solids, oils, soaps, and other contaminants would be filtered, settled into a sludge tank, and periodically removed for disposal in accordance with applicable regulations.

Some disposal to the local sanitary sewer system would be expected from the recycled, filtered wash water. The water discharged to the sanitary sewer system would be disposed in accordance with local and state regulations. For each of the build alternatives, existing sewer lines on adjacent streets are available for sewer connections. Nonrecycled vehicle wash water disposal volumes would be compared with conveyance capacity of the existing system. On-site filtering and recycling capacity would be developed in more detail during the final design to ensure compatibility with the existing system.

Any required stormwater detention facilities and infrastructure to collect storm and wastewater would connect to both the existing sewer system and the stormwater conveyances. Operational impacts on stormwater are discussed in Section 3.11, Water Resources.

Energy

The estimated aggregate annual operational and maintenance energy consumption for OMF South is 4,584 million Btu (1,343 megawatt hours) for the Midway Landfill Alternative, 4,679 million Btu (1,371 megawatt hours) for the South 336th Street Alternative, and 4,707 million Btu (1,379 megawatt hours) for the South 344th Street Alternative. OMF South operations would result in increases in energy consumption equivalent to the requirement for up to 59 homes for the Midway Landfill Alternative and up to 61 homes for the South 336th Street and South 344th Street Alternatives. Given that these increases represent a small fraction of PSE's total energy resources (less than 0.01 percent of PSE's annual sales of more than 20.6 million megawatt hours), the utility should have sufficient capacity and energy resources to accommodate the increases.

EMF

The anticipated EMF levels associated with each build alternative would increase from existing levels due to the increase of electrical equipment generating EMFs at the proposed OMF South as well as the LRVs and overhead catenary wires used to provide power to the lead tracks entering and exiting the site.

At each build alternative, EMF sources include LRVs and the overhead wires used to provide power to them. When LRVs accelerate or are moving quickly, more energy is required (and more

EMFs are produced) than when the vehicles are stationary or moving slowly. Consequently, EMFs generated at all build alternative sites would be relatively low due to the low rate of speed (no greater than 10 miles per hour) as the LRVs enter, exit, and circulate within the OMF and because the LRVs would be stationary for a substantial portion of the time. Some equipment used to maintain the LRVs would also be sources of EMFs, such as any electrical equipment and the on-site traction power substation facility. It is unlikely that EMFs from any of this equipment would reach levels higher than the LRVs. The LRVs would require more electrical current, which would produce higher levels of EMFs than the maintenance equipment.

Even when drawing full power, data from similar rail systems show that light rail operation is unlikely to generate health impacts for people along the tracks (Sound Transit 2016). The ranges of EMF exposure to track maintenance workers and train operators are below the guidelines established by the International Commission on Non-Ionizing Radiation Protection. Because maintenance workers and operators would be in the immediate vicinity of electrical equipment generating EMFs, the EMF exposure to the public in surrounding land uses from the build alternative sites would be lower than train-worker exposure. The build alternatives would not result in any health impacts on facility employees, visitors, or the surrounding public.

Stray currents could result if electrical current traveling through the LRVs or overhead wires were to jump to nearby cables that are buried in the ground. Control measures preventing stray currents would be developed by Sound Transit, if necessary, in coordination with the operators of electric and other utility lines.

Midway Landfill Alternative

Long-term impacts resulting from the Midway Landfill Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives.

South 336th Street Alternative

Utilities

The South 336th Street Alternative would require an additional traction power substation to power the mainline. The preliminary design places this traction power substation along 24th Avenue S near the mainline. This traction power substation would provide a power supply that would allow the LRVs to move back and forth between the new facility and the Federal Way Transit center. Like the on-site traction power substation described above under Impacts Common to All Alternatives, it would be powered by 12.5 kV electric lines connecting to the nearest power pole. Increased electricity demand at this traction power substation site may require additional distribution lines to be constructed and maintained by PSE. PSE may require additional energy resources to meet the increased demand. The specific needs would be determined during final design. The other operational impacts to utilities resulting from the South 336th Street Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives.

Energy

Operational impacts on energy resulting from the South 336th Street Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives.

EMF

Operational impacts from EMF for lead tracks and the OMF site are the same as those described previously under Impacts Common to All Build Alternatives.

As noted above, BPA 500 and 230 kV high-voltage transmission lines are located just south of The Commons in Federal Way. Because of the proximity to the mainline extension necessary for the South 336th Street and South 344th Street Alternatives, a portion of the transmission lines would have to be modified to avoid potential design conflicts and electromagnetic interference that could impact the light rail system. These modifications may include raising the lines and/or relocating towers. Sound Transit is working with BPA to identify the necessary changes; then BPA will evaluate potential EMF effects in the area as part of its separate evaluation of line modifications. However, both electric and magnetic field levels are expected to be well below threshold limits at the approximate edge of the right-of-way for the modified segment of the line.

LRVs approaching the OMF on the mainline tracks under the South 336th Street Alternative could be traveling up to the maximum operating speed of 55 mph. A report prepared by LTK Engineering Services (2006) describes extensive measurements and magnetic field modeling performed for the North Link line in Sound Transit's Link light rail system to evaluate magnetic fields that could be produced by operation of four-car trains. Even with the higher speeds, EMF levels expected within and adjacent to the LRVs along the mainline tracks would be considerably lower than exposure guidelines. It is important to note that, because these trains are moving, the resulting magnetic fields are transient in nature, typically lasting from a fraction of a second to a few seconds.

South 344th Street Alternative

Utilities

Traction power substation impacts related to the South 344th Street Alternative would be the same as those described for the South 336th Street Alternative. Operational impacts to utilities resulting from the South 344th Street Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives.

Energy

Operational impacts on energy resulting from the South 344th Street Alternative would be the same as those discussed above under Impacts Common to All Build Alternatives.

EMF

Operational impacts from EMF for lead tracks and OMF site are the same as those described previously under Impacts Common to All Build Alternatives. Impacts related to the BPA towers and transmission lines would be the same as noted above for the South 336th Street Alternative.

LRVs approaching the South 344th Street Alternative OMF site on the mainline tracks could be traveling up to the maximum operating speed of 55 mph. As described above for the South 336th Street Alternative, EMF levels expected within and adjacent to the LRVs along the mainline tracks would be considerably lower than exposure guidelines.

3.15.2.3 Construction Impacts

Impacts Common to All Build Alternatives

Utilities

Potential construction impacts common to all build alternatives would include:

- Relocating utility poles that support overhead lines; relocating aerial utilities to taller or different types of poles; constructing new distribution lines to provide power to substations.
- Relocating underground utilities from under future OMF South site facilities.
- Inspecting, repairing, and encasing underground utilities at yard track crossings.

In general, water lines and high-pressure gas mains would be located approximately 3 to 6 feet underground and sewer pipes 6 or more feet below grade. Smaller pipes, fiber optic cables, telephone lines, and other utilities would likely be located around 3 feet below grade. Water, sewer, and storm drainpipes would likely run parallel under streets, placed in various locations ranging from the center of the roadway to its periphery, while fiber optic cables, telephone lines, underground electrical conduits, and smaller pipes would be located beneath sidewalks. The effect on these utilities is dependent on their depth and material as well as excavation and fill limits of the build alternative sites. Underground utilities would be relocated or protected to allow for excavation and/or fill and to minimize load impacts on existing utilities from the weight of the LRVs and building foundations.

- Disruptions to service during utility relocations would be minimal, as temporary connections to customers would typically be established before starting relocation. Inadvertent damage to underground utilities could occur during construction if utility locations are uncertain or misidentified. Such accidents could temporarily affect service to the utilities' customers. Preconstruction surveys, and outreach measures to inform customers of potential disruptions would be used to minimize these impacts.
- Construction of distribution systems within the site boundaries for electric, natural gas, water, communications, sanitary sewer, and stormwater would be achieved through relocation and reuse of existing systems as well as installation of new systems. Specific requirements for the on-site distribution systems would be determined during final design.

Table 3.15-3 summarizes the potential impacts to utilities from construction of OMF South for each build alternative. Utilities designated as "relocated" would need to be replaced to maintain the current level of service. "Removed" utilities are ones that could possibly be removed but may not need to be replaced due to the change in land use or required service. "Protected" utilities could be left in place and not affected by construction.

The full extent of utility relocation would be determined during final design. Relocations may require work outside the proposed project limits to complete connections back to existing systems and maintain levels of service as required for a successful utility relocation.

Table 3.15-3 Summary of Utility Impacts for OMF South Build Alternatives

Utility Type	Midway Landfill Alternative	South 336th Street Alternative	South 344th Street Alternative
Water Main Distribution	None	3,750 feet relocated 3,520 feet removed	5,450 feet relocated 3,930 feet removed
Sanitary Sewer Conveyance	None	1,690 feet protected 180 feet removed	4,980 feet relocated 1,060 feet removed
Stormwater Collection	None	13,580 feet relocated 260 feet removed	14,570 feet relocated 1,800 feet removed
Electricity	None	2,280 feet of underground electrical relocated 2,000 feet of underground electrical removed 560 feet of overhead electrical removed	2,420 feet of underground electrical relocated 1,560 feet of underground electrical removed 2,140 feet of overhead electrical relocated 520 feet of overhead electrical removed
Natural Gas	None	2,040 feet relocated	3,290 feet relocated 390 feet removed
Cable/Telecom-munications	None	1,950 feet of underground telecom protected[1] 660 feet of underground telecom relocated 600 feet of overhead telecom relocated 3,800 feet of underground telecom removed	7,790 feet of underground telecom relocated 1,720 feet of underground telecom removed 4,240 feet of overhead telecom relocated 370 feet of overhead telecom removed
Petroleum/Fuel	None	None	None
Other Utilities	15,740 feet of the landfill gas extraction system removed[2]	None	None

Notes: All lengths approximate and will be determined during final design.

(1) Existing telecom ducts can likely be protected in place but may need to be relocated, depending on construction means and methods.

(2) Existing waste produced gaseous ventilation system; complete removal or modification of the system depends on the vertical alternative selected for this site during final design.

Energy

Table 3.15-4 summarizes estimated annual energy consumption (i.e., construction equipment fuel consumption; material and fuel extraction, production, and transport; and soil import/export) associated with construction of the build alternatives.

Table 3.15-4 Total Construction-Related Energy Consumption

Build Alternative	Gallons of Diesel Fuel[1]	Million Btu[2]
Midway Landfill Alternative		
Platform	6,554,216	900,425
Hybrid	8,540,342	1,173,281
Full Excavation	8,897,845	1,222,395
South 336th Street Alternative		
OMF Site	5,491,639	754,447
Mainline	496,532	68,214
Total	**5,988,170**	**822,661**
South 344th Street Alternative		
OMF Site	5,516,465	757,858
Mainline	640,526	87,996
Total	**6,156,991**	**845,854**

Notes:

(1) Downstream GHG emissions from the air quality analysis (Table 3.8-3) were used to estimate energy consumption.

(2) 1 U.S. gallon of diesel fuel = 137,381 Btu (EIA 2019).

EMF

During construction, EMFs would be generated by equipment use and movement of construction vehicles. However, EMFs would not be substantially higher than those generated at a typical construction site. Additionally, because there are no facilities with EMF-sensitive equipment in the study area, no impacts from EMF are anticipated during construction.

Midway Landfill Alternative

Utilities

No conflicts associated with natural gas were identified for the Midway Landfill Alternative site. New gas distribution piping would be constructed within the site boundary to service the OMF South buildings.

The Midway Landfill has approximately 15,740 feet of 6-inch-diameter polyvinyl chloride (PVC) pipe in a landfill gas ventilation piping system. Located underneath the landfill cap, it is designed to capture methane and other decay gases that are produced as the buried waste breaks down. After it is collected, the gas is mixed with natural gas to allow combustion and then flared off at an on-site facility. If the Midway Landfill Alternative is selected, this system would be modified or removed. Depending on the subsurface construction design option, the site preparation work would remove some or all of the landfill. Replacement or upgrade of the landfill gas extraction system and the continuation of the landfill gas monitoring system would be required for the Platform and Hybrid subsurface construction design options and may be required for the Full Excavation option.

No conflicts associated with underground or overhead electrical infrastructure were identified for the Midway Landfill Alternative. New electrical infrastructure would be constructed within the site boundary to service the OMF South buildings.

No conflicts associated with water main piping were identified for the Midway Landfill Alternative. New water main distribution piping would be constructed within the site boundary to service the OMF South buildings.

No conflicts associated with sanitary sewer piping were identified for the Midway Landfill Alternative. New sanitary sewer conveyance piping would be constructed within the site boundary to service the OMF South buildings.

No conflicts associated with storm drain piping were identified for the Midway Landfill Alternative. New stormwater conveyance piping may be constructed within the site boundary to service the OMF South buildings and would meet the requirements for the redeveloped site due to revised site grading along with new drainage patterns.

No conflicts associated with cable or telecommunication infrastructure were identified for the Midway Landfill Alternative. New cable and telecommunication infrastructure would be constructed within the site boundary to service the OMF South buildings.

Energy

As shown in Table 3.15-4 (Construction-Related Energy Consumption), the subsurface construction design options associated with the Midway Landfill Alternative are anticipated to result in higher levels of fuel consumption relative to the other build alternatives. This increase would not result in an adverse impact on energy resources.

EMF

Construction impacts from EMF for this alternative are the same as those described previously under Construction Impacts Common to All Build Alternatives.

South 336th Street Alternative

Utilities

This build alternative would require 24th Avenue S to be realigned and rebuilt to make room for the proposed mainline track alignment for either design option. The realignment of the road would have impacts on an existing 30-inch sewer main between the street and I-5 while also impacting the existing overhead electrical poles, wiring, and associated telecom lines along the east side of the street. For impacts of this magnitude, Federal Way requires existing overhead utilities to be converted to underground. In this area, this would likely be along the eastern sidewalk because there is a potential that future redevelopment could lead to replacement of the western side of the road. The new mainline track would also have minor impacts on several other utilities along its proposed alignment until it reaches the OMF site. Table 3.15-5 summarizes those impacts and provides additional information about the existing utilities that would potentially conflict with the mainline.

Table 3.15-5 South 336th Street and South 344th Street Alternatives Mainline Utility Impacts Summary

Utility Type	Length	Utility Owner	Utility Size	Utility Material	Mainline Impact[1]	Relocation/ Protect
Underground Electrical Distribution	473	PSE	Unknown	PVC conduit	Column	R
Underground Electrical Distribution	495	PSE	Unknown	PVC conduit	Column	R
Sanitary Sewer Main	198	Lakehaven Water and Sewer District	12 feet	CI	Column	R
Water Main	43	Lakehaven Water and Sewer District	16 feet	DI	Column	R
Sanitary Sewer Main	197	Lakehaven Water and Sewer District	30 feet	PVC	Column	R
Sanitary Sewer Main	Crossing	Lakehaven Water and Sewer District	8 feet	PVC	Column	R
Overhead Electrical Transmission	Crossing	BPA	500 kVA and 230 kVA	Wires	Mainline	R
Overhead Electrical Transmission	Crossing	BPA	230 kVA and 230 kVA	Wires	Mainline	R
Water Main	Crossing	Lakehaven Water and Sewer District	2 feet	Poly	Column	R
Sanitary Sewer Main	672	Lakehaven Water and Sewer District	Private	Unknown	Column and drainage pond	R
Telecom Duct Bank	622	CenturyLink (Lumen)	1 duct	PVC conduit	Column and drainage pond	R
Underground Electrical Distribution	316	PSE	75 kVA	PVC conduit	Column	R
Underground Electrical Distribution	530	PSE	100 kVA	PVC conduit	Drainage pond	R
Water Main	357	Lakehaven Water and Sewer District	2 feet	Poly	Drainage pond	R
Underground Electrical Distribution	1,447	PSE	100 kVA	PVC conduit	Retained fill	R
Water Main	1,308	Lakehaven Water and Sewer District	2 feet	Poly	Retained fill and drainage pond	R
Telecom Duct Bank	564	CenturyLink (Lumen)	1 duct	PVC conduit	Retained fill	R
Underground Electrical Distribution	575	PSE	37.5 kVA	PVC conduit	Drainage pond	R
Telecom Duct Bank	200	CenturyLink (Lumen)	1 duct	PVC conduit	Drainage pond	R

Table 3.15-5 South 336th Street and South 344th Street Alternatives Mainline Utility Impacts Summary (continued)

Utility Type	Length	Utility Owner	Utility Size	Utility Material	Mainline Impact[1]	Relocation/ Protect
Water Main	464	Lakehaven Water and Sewer District	2 feet	Poly	Drainage pond	R
Underground Electrical Distribution	361	PSE	50 kVA	PVC conduit	Drainage pond	R
Overhead Electrical Distribution	1,100	PSE	25 kVA	Wires	At grade	R
Overhead Telecom Lines	1,100	CenturyLink (Lumen)	1 aerial	Wires	At grade	R
Cell Tower	Crossing	Seattle SMSA LP	1 tower	N/A	Obstruction	R
Telecom Service[2]	Crossing	CenturyLink (Lumen)	1 service	Buried	At grade	Remove
Sanitary Sewer Main	Crossing	Lakehaven Water and Sewer District	30 feet	Concrete	Retained fill	R
Water Main	Crossing	Lakehaven Water and Sewer District	6 feet	Cast iron	Retained fill	R
South 344th Street Alternative, Enchanted Parkway Tail Track Option						
Overhead Telecom Lines	Crossing	Comcast	Aerial	Wires	Mainline	R
Overhead Electrical Distribution	Crossing	PSE	25 kVA	Wires	Mainline	R
Telecom Duct Bank	Crossing	CenturyLink (Lumen)	3 duct	PVC conduit	Column	Protect
Water Main	Crossing	Lakehaven Water and Sewer District	8 feet	DI	Column	R
Underground Electrical Distribution	Crossing	PSE	25 kVA	PVC conduit	Column	R
Gas Main	Crossing	PSE	2 feet	MDPE	Column	R
Telecom Duct Bank	Crossing	Comcast	unknown	PVC conduit	Column	R
South 344th Street Alternative, I-5 Tail Track Option						
Overhead Electrical Distribution	Crossing	PSE	25 kVA	Wires	Mainline	R
Overhead Telecom Distribution	Crossing	Comcast	Aerial	Wires	Mainline	R
Telecom Duct Bank	Crossing	CenturyLink (Lumen)	3 ducts	PVC conduit	Column	Protect

Notes: All lengths are approximate; CI = cast iron; DI = ductile iron; kVA = kilovolt-amp; MDPE = medium-density polyethylene; Poly = polyethylene; PVC = polyvinyl chloride.

(1) The mainline is the principal track that connects stations and OMFs. The mainline in Federal Way is planned to be constructed as part of TDLE and therefore would be built regardless of which OMF South alternative is selected.

(2) Existing service to a building that would be demolished for project; new service/replacement is not anticipated due to building removal.

The mainline would also intersect with the location of the existing BPA transmission corridor and would have to cross the existing lines. This intersection creates a vertical conflict between the proposed mainline and existing power line elevations. Sound Transit and BPA are working together to address this conflict. BPA will lead the engineering and environmental review effort.

The mainline would be located near an existing cell tower adjacent to I-5, 24th Avenue S, and Oakland Hills Boulevard. The completed mainline could block or interfere with cell tower transmission waves, which would cause a service disruption. The tower would likely be relocated to available open property further west rather than next to I-5.

In the center of the South 336h Street Alternative OMF site, approximately 2,045 linear feet of 2-inch-diameter medium-density polyethylene natural gas pipeline owned by PSE extends from the northern to the southern boundary. This gas main may conflict with proposed buildings and storage tracks for OMF South. Impacted gas mains would be relocated as necessary to keep the existing level of service to this site and the surrounding area. The design team would work with PSE during the duration of design for the project to confirm what impacted mains would be relocated and identify new gas piping that may be required to service the new buildings.

There are two electrical vaults in the center of the site that would likely be impacted. In addition, there are three vaults on the southern edge and two on the western edge of the site. These are less likely to be impacted due to their proximity to the site boundary. Approximately 4,300 linear feet of underground electrical ducts and lines running through the site, owned by PSE, would potentially be impacted. The existing electrical infrastructure may be relocated as necessary to maintain the current level of service to the site and adjacent areas. Additional electrical distribution infrastructure may be required to serve the new OMF South buildings and would also be installed at that time.

There is also the potential to affect existing overhead electrical distribution lines. There are approximately 430 linear feet of 25 kV overhead electrical lines along the southwest boundary that terminate at a pole in the southwest corner of the site. However, the likelihood of potential impacts to these lines is relatively low due to their location and distance away from any potential vertical clearance issues with the tracks within the OMF South site.

Approximately 7,200 linear feet of 8-inch ductile iron water pipe owned by Lakehaven Water and Sewer District runs throughout the site. The size of the on-site water mains does not rise to the Sound Transit major impact category but given the total length of pipe with potential for conflict, this site does pose a notable impact. The water mains located within the site boundary may be relocated as necessary to maintain the current level of service to the site and neighboring areas. Because they have a potential for corrosion due to stray current from the proposed tracks, the mains may need to be removed or upgraded to construct this alternative regardless of building impacts. There are also 14 fire hydrants located throughout the site that may need to be removed and replaced. New water main distribution piping may be constructed within the site boundary to service the OMF South buildings.

No large-diameter sewer mains run through the site, so it avoids a major impact classification. Approximately 1,690 linear feet of 8-inch PVC sanitary sewer system owned by Lakehaven Water and Sewer District runs north to south along the eastern site boundary and may conflict with the proposed OMF South. Given the location of the existing sanitary sewer main along this alternative site boundary and its material, no impacts are anticipated for the sewer main at this time. The status of impacts to the sewer system would be tracked and confirmed as the project

progresses through final design. New sanitary sewer mains may be installed within the site boundary to service the OMF South buildings.

There are 13,580 linear feet of 12-inch storm drainpipe of various materials that could be removed or abandoned in place. Unlike other existing utilities in the site, the storm drain system would not be relocated because the redevelopment of the site for OMF South would likely change drainage patterns, which would render the old system obsolete. Like the on-site water conveyance impacts, the size of the storm drain pipes does not trigger a major impact designation; however, the linear footage of impacts is considerable. New storm drain conveyance piping may be installed to address the new drainage conditions and provide a system for any new service required for the OMF South buildings.

Century Link (Lumen) owns fiber optic cable in the site; there are 1,950 linear feet of ducts and lines running along the northern site boundary and 560 linear feet at the southern boundary. Due to the proximity to the edge of the site, these are not likely to be impacted or may be protected. The status of impacts to any on-site cable and telecommunication systems would be evaluated throughout project design, and appropriate action would be taken if new impacts are identified. New telecommunications infrastructure may be installed to provide service for the OMF South buildings.

Comcast owns 3,520 linear feet of fiber optic and television cable ducts running throughout the site that would be impacted by construction of the facility if this option is chosen. Additionally, Comcast also has 600 linear feet of overhead telecom wires running along S 340th Street that may be impacted by the project. Any part of the Comcast system located within the site boundary may be relocated as necessary to maintain the current level of service to the site and neighboring areas. As stated previously, any new infrastructure needs from Comcast may be installed to provide service for the new OMF South buildings.

Energy

As shown in Table 3.15-4 (Construction-Related Energy Consumption), the South 336th Street Alternative is anticipated to result in a similar level of fuel consumption relative to all the build alternatives. This minor increase would not result in an adverse impact on energy resources.

EMF

Construction impacts from EMF for this alternative are the same as those described previously under Construction Impacts Common to All Build Alternatives.

South 344th Street Alternative

Utilities

Potential impacts related to construction of the mainline would be the same as those described above for the South 336th Street Alternative.

Both the Enchanted Parkway and the I-5 mainline tail track alignments would impact electrical utilities. At the end of S 344th Street on the east side of I-5, overhead distribution electrical power and telecom lines are in vertical conflict with the tracks. Taller poles would be necessary to raise the lines clear of the elevated mainline.

Approximately 3,700 linear feet of 2-inch-diameter polyethylene natural gas pipeline owned by PSE is located within the South 344th Street Alternative OMF site. These gas mains may conflict with proposed buildings and storage tracks for the OMF South site. The gas mains may be relocated as necessary to keep the existing level of service to this site and the surrounding area. New gas piping may be installed to service the new OMF South buildings.

There are currently 16 electrical vaults located in the site that may conflict with the proposed OMF South. Other electrical utilities that may be impacted are 4,000 linear feet of underground electrical ducts and lines along with 2,700 linear feet of 25 kV overhead electrical distribution lines terminating at 16 poles, owned by PSE throughout the site. The existing electrical vaults and infrastructure may be relocated as necessary to maintain the current level of service to the site and adjacent areas. Additional electrical distribution infrastructure may be required to serve the new OMF South buildings and would also be installed at that time.

An existing PSE substation is located near the alternative site's boundary in the southwest corner. The existing conceptual design does not impact the existing substation, but because the work limits are near the substation, this potential impact should be noted. Substations are important components of electrical infrastructure.

Approximately 9,400 linear feet of 10-inch to 8-inch ductile iron water pipes owned by Lakehaven Water and Sewer District run throughout the site. Their size does not rise to the Sound Transit major impact category but given the total length of pipe with potential for conflict, this poses a notable impact. The water mains located within the site may be relocated to maintain the current level of service to the site and neighboring areas. Because they have a potential for corrosion due to stray current from the proposed tracks, the mains may need to be removed or upgraded, regardless. New water main distribution piping may be constructed within the site boundary to service the OMF South buildings. There are also 28 fire hydrants located throughout the site that may need to be removed and replaced.

No large-diameter sewer mains run through the site, so it avoids a major impact classification; 6,050 linear feet of 8-inch PVC sanitary sewer system owned by Lakehaven Water and Sewer District runs throughout the site and may conflict with the proposed OMF South. The sewer mains located within the site boundary may be relocated as necessary to maintain the current level of service to the site and surrounding areas. New sanitary sewer mains may be installed within the site boundary to service the proposed facility.

There are 520 linear feet of 48-inch corrugated metal storm pipe on the north half of the site, 170 linear feet of 36-inch corrugated metal storm pipe on the north half of the site, and 125 linear feet of 78-inch corrugated metal storm pipe in the southeastern corner of the site that are likely to conflict with OMF South. The size of these pipes does reach the threshold to be noted as major impacts to this alternative site. Approximately 15,550 linear feet of additional smaller-diameter storm drainpipe of various sizes and materials also runs throughout the site. Similar to the larger-diameter pipe discussed above, the existing smaller-diameter pipe would also likely be removed or abandoned in place to allow for the changing site grading and drainage conditions. New storm drain conveyance piping may be installed to address the new drainage patterns and provide a system for any new service required for the OMF South buildings.

There are approximately 5,300 linear feet of fiber optic cable owned by CenturyLink (Lumen) in PVC conduit and ducts throughout the site. CenturyLink (Lumen) also controls 1,940 feet of overhead telecom wires along multiple existing streets within the build alternative. The telecommunications infrastructure may be relocated as necessary to maintain the current level

of service to the site and adjacent areas. New telecommunications systems may be installed to provide service for the OMF South buildings.

Comcast owns approximately 4,200 linear feet of fiber optic and television cable ducts running throughout the site that would be impacted by construction of the facility. Additionally, Comcast also has approximately 2,700 linear feet of overhead telecom wires running along multiple existing streets within the alternative site boundary. Any part of the Comcast system located within the site boundary may be relocated as necessary to maintain the current level of service to the site and neighboring areas. As stated previously, any new infrastructure needs from Comcast may be installed to provide service for the new OMF South buildings.

Energy

As shown in Table 3.15-4 (Construction-Related Energy Consumption), the South 344th Street Alternative is anticipated to result in a similar level of fuel consumption relative to all the build alternatives. This minor increase would not result in an adverse impact on energy resources.

EMF

Construction impacts from EMF for this alternative are the same as those described previously under Construction Impacts Common to All Build Alternatives.

3.15.2.4 Avoidance and Minimization of Impacts

Sound Transit used several design measures to avoid and minimize potential utility impacts. For example, where feasible, columns for elevated mainlines would be placed to avoid impacts to underground utilities. Sound Transit would also design the mainline alignment to maintain access to utilities for maintenance and repair per the utility owner's requirements. In some cases, that would require Sound Transit to relocate sewer manholes, pipes, vaults, or other access points as part of mainline construction. Sound Transit would work closely with utility providers to maintain required access to these utilities and any relocated sewer manholes and vaults, utility mains, fire hydrants, and other features. To minimize potential impacts due to service disruptions, Sound Transit would perform preconstruction surveys to identify utility locations as well as communicate with customers to inform them of planned or potential service disruptions.

To avoid or minimize potential corrosion impacts, Sound Transit would coordinate with utility providers to identify appropriate control measures. Typical design measures include:

- Installing cathodic protection systems
- Installing insulating unions to break the electrical conductivity of the utility
- Isolating electrical rails from the ground
- Installing stray-current-control track fastening systems, where appropriate

To avoid or minimize consumption and demand on utilities, such as energy and water, Sound Transit would integrate efficient operating practices at existing and new facilities that require the use of energy- and water-saving equipment and related design strategies.

3.15.2.5 Indirect Impacts

No indirect impacts related to utilities, energy, and EMF would result from construction and operation of the proposed project.

3.15.3 Potential Mitigation Measures

With planning and coordination with utility owners, none of the build alternatives would result in adverse impacts to utilities. There would be no impacts to energy resources or EMFs. As a result, no mitigation would be required.

3.16 Historic and Archaeological Resources

The historic and archaeological resources section analyzes potential impacts associated with the OMF South project alternatives to historic-period, built-environment resources and archaeological resources that are eligible for or listed in local, state and/or national registers of historic places. Historic-period, built-environment resources are buildings, structures, and objects that meet the minimum age criteria for consideration under a particular local, state, and/or national register. Archaeological resources are locations including objects that are in disuse and can be attributed to past human activities and that meet the minimum age criteria for consideration under particular local, state, and/or national guidelines and regulations. Collectively, historic-period, built-environment resources and archaeological resources that are eligible for the National Register of Historic Places (NRHP) are referred to as "historic properties."[3]

To be eligible for listing in the NRHP, a cultural resource must be at least 50 years old, meet one of four criteria for significance, and possess sufficient integrity to express its significance (NPS 1995; see Appendix G4, Historic and Archaeological Resources Technical Report, for additional information). To be individually eligible for listing in the Washington Heritage Register (WHR), a property must be significant within a historic context. Resources listed in the NRHP are automatically added to the WHR (WAC 25-12); as such, the same four criteria utilized for the NRHP are used to evaluate for eligibility to the WHR (DAHP 2020). To be designated as a King County Landmark, a resource must be at least 40 years old or, in the case of a landmark district, contain resources that are more than 40 years old. This differs from NRHP criteria, which require that a property be at least 50 years old, unless it is exceptionally important.

For OMF South, Sound Transit's analysis assessed whether surveyed resources met criteria necessary to be eligible for listing in the NRHP. Where appropriate, Sound Transit sought input from stakeholders. Additionally, the Washington State Department of Archaeology and Historic Preservation (DAHP) provided input regarding their assessment of NRHP eligibility.

The King County Landmark eligibility recommendations found in this Draft Environmental Impact Statement are recommendations only, based on review of the King County Landmarks Commission ordinance (King County Code Chapter 20.62; King County Policy LUD 16-1). The cities of Kent and Federal Way have both adopted this section of the King County Code concerning the protection and preservation of landmarks:

- City of Kent Code Chapter 14.12, Landmark Designation and Preservation, which adopts King County Code Chapter 20.26, under Ordinance No. 3809.
- City of Federal Way Code Chapter 19.285, Protection and Preservation of Landmarks, which adopts King County Code Chapter 20.26.

In addition to SEPA, the State of Washington requires compliance with cultural resources management laws and regulations under the RCW 27.53, Archaeological Sites and Resources; RCW 27.44, Indian Graves and Records; and RCW 68.50.645, Skeletal Human Remains – Duty to Notify. The latter regulation provides a strict process for notification of law enforcement and other interested parties in the event of the discovery of any human remains, regardless of inferred cultural affiliation.

[3] Historic built-environment properties are differentiated from historic-period, built-environment resources, the former being eligible for the NRHP (and/or other historic registers) while the latter term is used to refer solely to those buildings, structures, and objects that meet minimum age criteria for historic register consideration.

The Historic and Archaeological Resources Technical Report (Appendix G4) includes additional details on the regulatory, environmental, and cultural context as well as results and recommendations.

3.16.1 Affected Environment

The area of impact for each OMF South build alternative is discussed separately below. The area of impact includes all project elements and areas extending from the project elements (e.g., the OMF site and mainline, lead, and tail tracks) to the nearest parcel, or a maximum distance of 200 feet where large tax parcels are adjacent to project elements. The South 336th Street and South 344th Street alternatives include in their area of impact approximately 1.8 miles of new mainline tracks that would connect each of the sites to the Federal Way Link Extension terminus at the Federal Way Transit Center. Figure 3.16-1 shows the area of impact for the three build alternatives. The depth of anticipated impacts has not been finalized but is expected to range from near-surface impacts to up to 180 feet below ground surface, depending on the alternative.

The study area used for the background and literature review was a 1-mile radius centered on each of the areas of impact. A file search of DAHP's Washington Information System for Architectural and Archaeological Records Data (WISAARD) along with Government Land Office records and maps, ethnographic reports, historical maps, and aerial photographs were used to evaluate the archaeological sensitivity for each area of impact.

Fourteen previous cultural resource studies have been undertaken within the 1-mile study area of the Midway Landfill Alternative and 15 previous investigations within the 1-mile study area encompassing the South 336th Street and 344th Street alternatives. No previously documented precontact archaeological sites or historic built-environment properties are known within the project areas of impact. Two historic-period archaeological sites are located within the areas of impact. Site 45KI1476 is the historic Midway Landfill, which has been determined not eligible for the NRHP by FTA, with DAHP concurrence (Chidley 2020). Site 45KI719 was located within the potential construction limits of the South 344th Street Alternative but was determined not eligible for listing in the NRHP and subsequently removed by WSDOT during construction associated with I-5 improvements.

Field Survey and Evaluation Methods

Prior to the commencement of the field surveys, a Cultural Resources Survey Plan was prepared for review by the Puyallup Tribe of Indians, Muckleshoot Indian Tribe, Nisqually Indian Tribe, the Confederated Tribes and Bands of the Yakama Nation, and DAHP. Each consulted party approved or declined to comment on the plan, which described the proposed survey activities and methods.

The field survey included a historic-period, built-environment resources survey and inventory for previously undocumented or unevaluated buildings, structures, and objects constructed in 1985 or earlier, as well as an archaeological survey that included pedestrian transects and subsurface archaeological investigations (shovel probes and hand auger cores).

Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

0 1 2 Miles

FIGURE 3.16-1
Areas of Impact
OMF South Alternatives

OMF South

Historic-Period, Built-Environment Resources

Resources surveyed and inventoried for the OMF South project will be 40 years old or older at the time of project construction or were built in or before 1985. The only built-environment resources built in 1985 or earlier that were excluded from survey were the BPA transmission system elements and resources with formal NRHP determinations of eligibility dating to within the last 10 years (per DAHP guidance). BPA is conducting its own consultation with DAHP under Section 106 regarding the relocation of towers and transmission lines in association with OMF South and TDLE. The towers and transmission lines are assumed eligible for listing in the NRHP, based on previous evaluations of BPA resources. Results will be summarized in the OMF South Final Environmental Impact Statement and also in the Tacoma Dome Link Extension Environmental Impact Statement when the consultation is complete.

Field survey took place between December 2019 and January 2020. Survey staff collected photos and field notes sufficient to complete physical descriptions, integrity assessments, and evaluations of individual resources for listing in the NRHP, WHR, and/or King County Register of Historic Places (KCRHP), as appropriate. All resources were surveyed from the public right-of-way unless otherwise noted.

Field research results combined with archival research provided the background for recommendations regarding whether or not each resource met criteria necessary for NRHP, WHR, or KCRHP eligibility.

Archaeological Resources

Archaeological survey occurred over several field sessions from February to June 2020. Pedestrian and subsurface investigations excluded areas of the South 336th Street and South 344th Street alternatives where they overlapped with the TDLE Area of Potential Effects. Sound Transit, in cooperation with FTA, is conducting a concurrent but separate analysis of the potential impacts to historic and archaeological resources for the TDLE environmental review process. Fieldwork results for the OMF South and TDLE overlap area will be included in the OMF South Final Environmental Impact Statement.

Systematic surface and subsurface survey (shovel probe and auger cores) was conducted at each area of impact. Shovel probes were spaced at regular 20-meter intervals in areas of high archaeological probability, whereas 30 meters spacing was used in areas of low probability. All sediments in shovel and auger cores were screened through standard 0.25-inch mesh and pertinent information was collected for each shovel probe or auger core.

3.16.1.1 Survey Results

Historic-Period, Built-Environment Resources

Architectural historians surveyed and inventoried a total of 86 historic-period, built-environment resources in the area of impact, mapped in Figures 3.16-2 and 3.16-3. A total of 58 historic-period built-environment resources were old enough to meet minimum age criteria for NRHP eligibility consideration. Results for those resources old enough to qualify for the NRHP were documented in historic property inventory forms in DAHP's WISAARD database and can be found in Appendix G4, Historic and Archaeological Resources Technical Report. Based on survey results, Sound Transit has recommended, and DAHP has agreed, that none of the historic-period, built-environment resources surveyed for this project meet criteria necessary for

NRHP eligibility (see Appendix B, Public Involvement and Agency Coordination, for the correspondence from DAHP).

Archaeological Resources

Table 3.16-1 lists the archaeological resources found within the OMF South build alternatives' areas of impact. No archaeological resources were identified within the Midway Landfill Alternative area of impact. Two archaeological sites, 45KI1542 and 45KI1543, were identified in the South 336th Street Alternative area of impact. Site 45KI1543 is also located within the South 344th Street Alternative area of impact.

Table 3.16-1 Summary of Archaeological Resources within the Areas of Impact

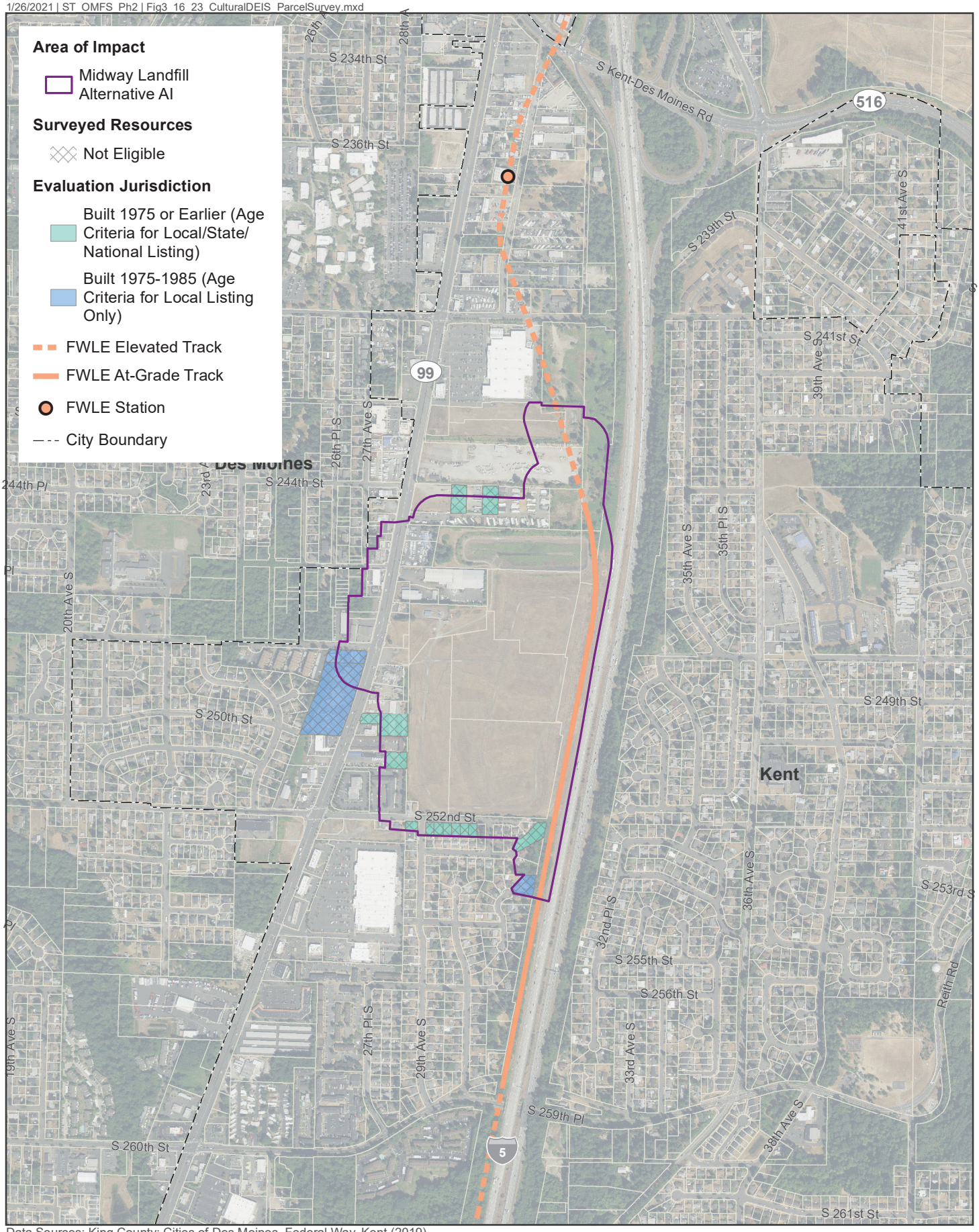
Area of Impact (AI)	Resource Type	Resource Description	Resource Age	Does Resource Meet NRHP, WHR, Local Register Criteria?
Midway Landfill	Historic period site	Midway Landfill (45KI1476)	1966-1983	No
South 336th Street	Historic period site	Historic period foundation (45KI1542)	ca 1930	No
	Historic period site	Debris scatter (45KI1543)[1]	historic-period	No
South 344th Street	Historic period site	Debris scatter (45KI1543)[1]	historic-period	No
	Historic period site	Historic period site (45KI719)	1936	No

Note:
(1) Site overlaps the South 336th Street and South 344th Street alternatives.

Site 45KI1542 is a concrete slab foundation dated to the 1930s using aerial imagery. The subsurface investigations around the foundation did not identify any additional archaeological deposits. Site 45KI1543 is a historic debris scatter, including brick and glass that appear to be in disturbed context. Sound Transit has recommended, and DAHP has agreed, that none of the historic-period, built-environment resources surveyed for this project meet criteria necessary for NRHP, WHR, or KCRHP eligibility (see Appendix B, Public Involvement and Agency Coordination, for the correspondence from DAHP).

Field surveys have not yet been completed in the OMF South and TDLE overlap area. For the purposes of this Draft Environmental Impact Statement, Sound Transit relied on a detailed literature search and other background information. Literature review and other archival research suggested that the areas of impact are low probability for cultural resources because they are located on glacial landforms that have been further modified through logging and development during the historical and modern periods.

For more details on survey results, see Appendix G4, Historic and Archaeological Resources Technical Report.



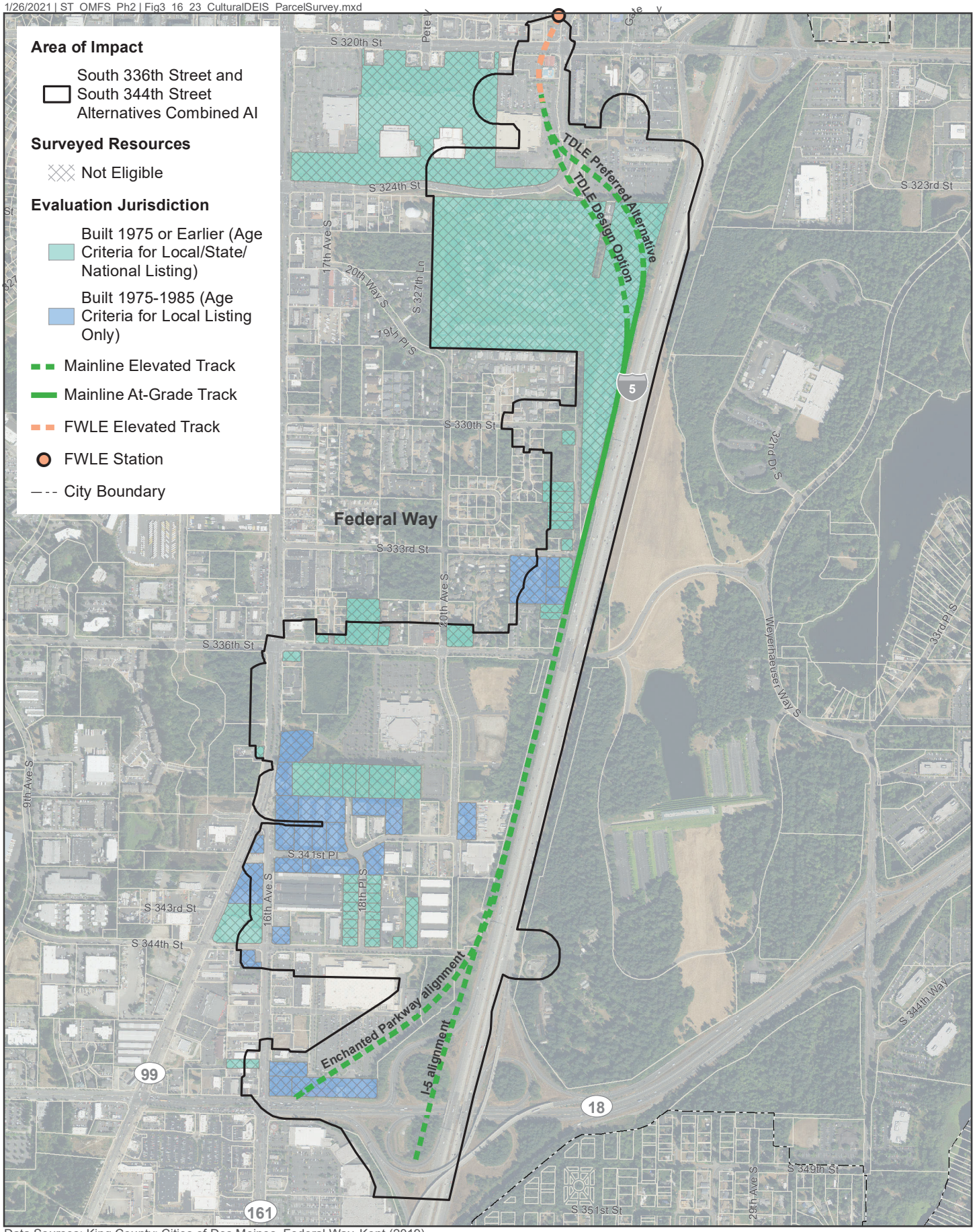
Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE 3.16-2
Built Environment Parcel Survey
Midway Landfill Alternative

OMF South



Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

N

0 1,000 2,000 Feet

FIGURE 3.16-3
Built Environment Parcel Survey
South 336th Street and South 344th Street Alternatives

OMF South

3.16.2 Environmental Impacts

3.16.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to historic and archaeological resources from construction or operation of OMF South would not occur. There are no identified archaeological resources or historic buildings affected by FWLE, and FTA made a finding of "No Adverse Effect." DAHP concurred with the finding. Other planned projects in the area could have impacts to historic and archaeological resources, depending on their location. Because TDLE would open after OMF South, impacts associated with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

3.16.2.2 Long-Term Impacts

Midway Landfill Alternative

There are no archaeological sites or historic-period, built-environment resources that meet criteria for listing in the NRHP, WHR, or local registers within the Midway Landfill Alternative area of impact. As such, this alternative would have no impacts to historic or archaeological resources.

South 336th Street Alternative

Construction of the mainline would require the relocation of BPA powerlines at the north end of the area of impacts. The BPA towers and transmission lines are assumed eligible for listing in the NRHP, based on previous evaluations of BPA resources; however, the raising of the lines is not expected to constitute an adverse effect. There are no other archaeological sites or historic-period, built-environment resources that meet criteria for listing in the NRHP, WHR, or local registers within the South 336th Street Alternative area of impact. As such, this alternative would have no impacts to historic or archaeological resources.

South 344th Street Alternative

Similar to the South 336th Street Alternative, construction of the mainline would require relocation of BPA powerlines at the north end of the site. However, this is not expected to constitute an adverse effect. There are no other archaeological sites or historic-period, built-environment resources that meet criteria for listing in the NRHP, WHR, or local registers within the South 344th Street Alternative area of impact. As such, this alternative would have no impacts to historic or archaeological resources.

3.16.2.3 Construction Impacts

Midway Landfill Alternative

Because no previously documented or newly discovered eligible archaeological sites have been identified within this area of impact and this area of impact is within an area of low probability for precontact archaeological sites, the project is not likely to impact archaeological resources.

South 336th Street Alternative

Because no previously documented or newly discovered eligible archaeological sites have been identified within the OMF site area of impact and this area of impact is within an area of low probability for precontact archaeological sites, the project is not likely to impact archaeological resources. Additional archaeological surveys will be conducted along the mainline track within the OMF South and TDLE overlap area.

South 344th Street Alternative

Because no previously documented or newly discovered eligible archaeological sites have been identified within the OMF site area of impact and this area of impact is within an area of low probability for precontact archaeological sites, the project is not likely to impact archaeological resources. Additional archaeological surveys will be conducted along the mainline track within the OMF South and TDLE overlap area.

3.16.2.4 Avoidance and Minimization of Impacts

An Inadvertent Discovery Plan will be developed and implemented for the project during construction to outline appropriate procedures for addressing the discovery of human remains and archaeological resources made during ground-disturbing work. The purpose of the Inadvertent Discovery Plan is to minimize the risk of damage to currently unknown archaeological resources. Sound Transit would coordinate with the State Historic Preservation Officer and tribes to review the plan. A contractor orientation would also be prepared to familiarize construction crews with Inadvertent Discovery Plan procedures and the kinds of resources that may be encountered during construction.

3.16.2.5 Indirect Impacts

No indirect impacts related to historic and archaeological resources would result from construction and operation of the proposed project.

3.16.3 Potential Mitigation Measures

As the project would not impact historic built-environment resources, no mitigation is required.

No eligible archaeological sites have been identified. No mitigation measures are required beyond the Inadvertent Discovery Plan to address potential discoveries during construction.

3.17 Parks and Recreational Resources

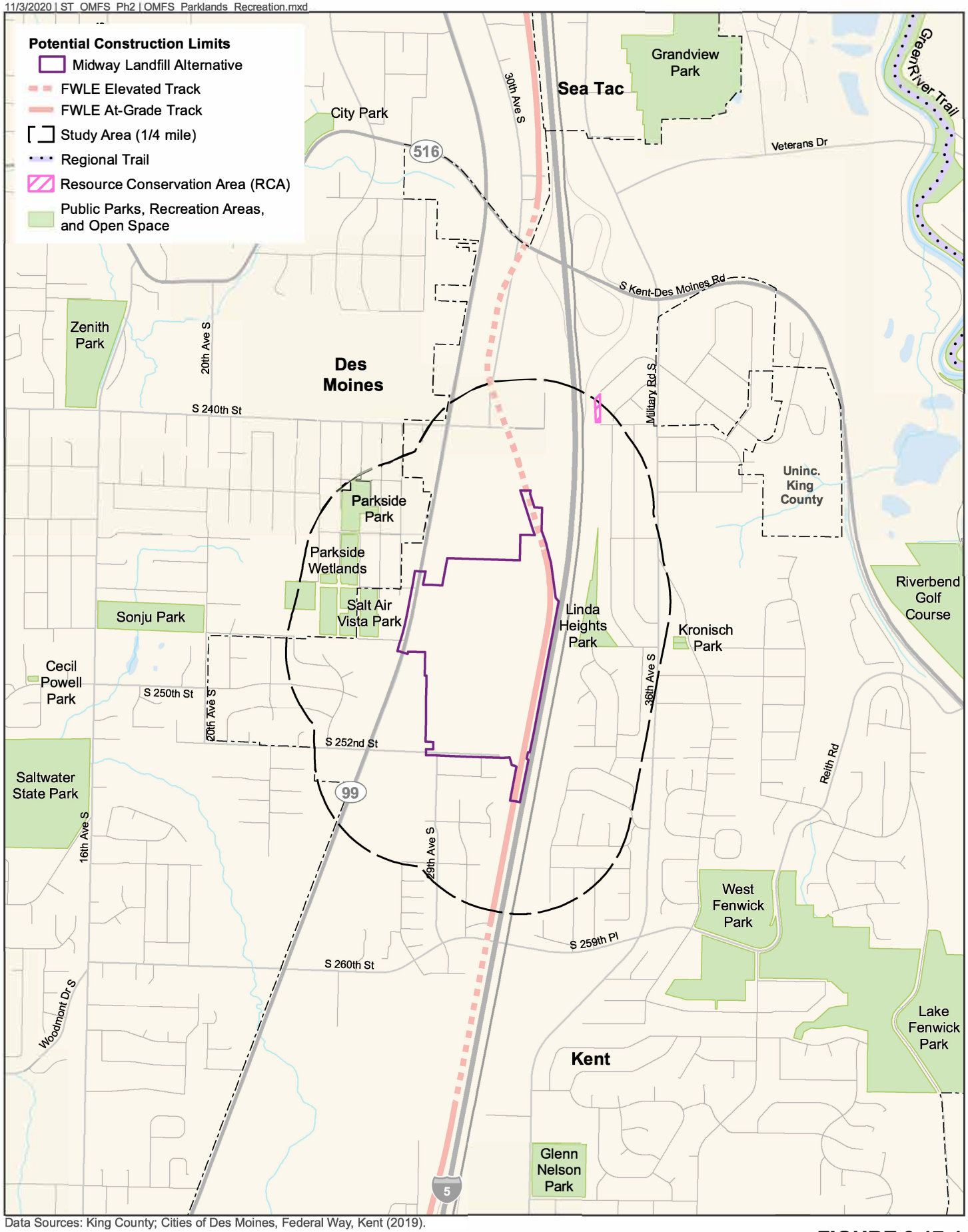
This section evaluates impacts to parks and recreational resources associated with the OMF South build alternatives, including potential recreational properties funded by state and/or federal grants with special provisions. Parks and recreational resources include the following facilities and land uses:

- Federal, state, and local parks, playgrounds, recreation centers, and other public recreation facilities, such as golf courses and pools
- Designated public open spaces, greenbelts, and open space corridors
- Recreational trails

Comprehensive plans for King County and the cities of Kent and Federal Way were reviewed, including park plans if available. The evaluation considered impacts to the use or enjoyment of existing and planned recreational resources within the study area, including potential impacts to resource access, facilities, functions, or character.

The study area for parks and recreational resources includes facilities and land within 200 feet of the potential construction limits of the mainline tracks and within 0.25 mile of the potential construction limits for each of the OMF sites. The study areas for the South 336th Street and South 344th Street alternatives are combined for the purposes of this analysis because of their geographic overlap. The combined study area also includes the mainline track that would connect the sites to the Federal Way Transit Center and the southern terminus of FWLE. All parks and recreation facilities within each study area are listed below and are shown in Figure 3.17-1 and Figure 3.17-2.

In order to support environmental review under NEPA for potential federal agency approvals, impacts on parks and recreational resources were also evaluated under two federal statutes: Section 4(f) of the U.S. Department of Transportation Act of 1966 and Section 6(f) of the 1965 Land and Water Conservation Fund Act. These statutes require specific analysis of recreational resources, including avoidance or mitigation for certain direct impacts on some properties with parks and recreational uses. Analysis is provided in Appendix E2, Section 4(f) Evaluation, as part of Appendix E, NEPA Compliance Documentation.

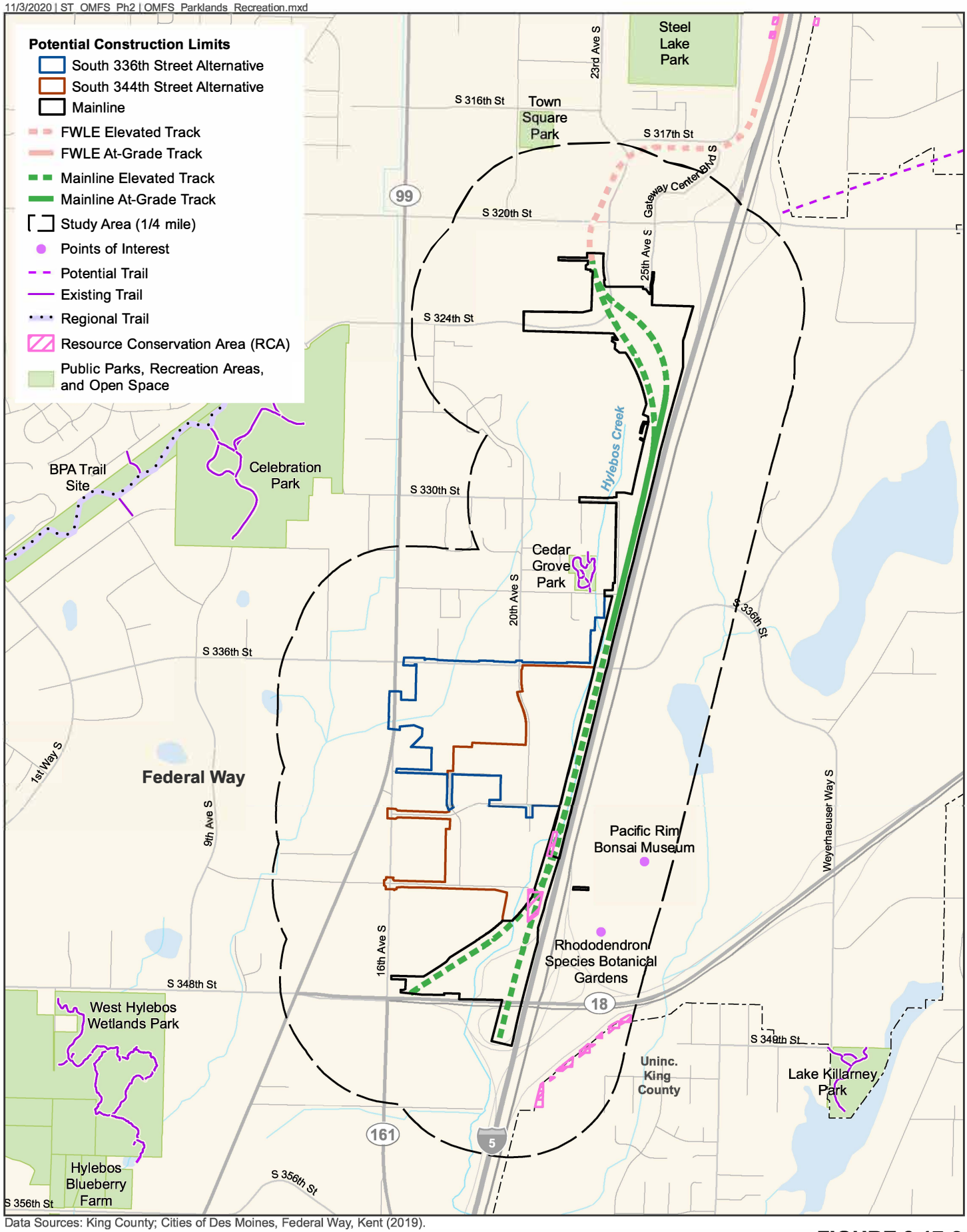


Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

0 1,000 2,000 Feet

FIGURE 3.17-1
Parks and Recreational Resources
Midway Landfill Alternative

OMF South



Data Sources: King County; Cities of Des Moines, Federal Way, Kent (2019).

0 1,000 2,000 Feet

FIGURE 3.17-2
Parks and Recreational Resources
South 336th Street and South 344th Street Alternatives
OMF South

3.17.1 Affected Environment

3.17.1.1 Midway Landfill Alternative

The following parks are within the Midway Landfill Alternative study area:

- **Parkside Park, Des Moines.** This 4.4-acre neighborhood park has an ADA-accessible paved trail system to all portions of the park, a multi-use paved sport court, fitness equipment, picnic tables, and benches. Mature trees frame the central open lawn and active recreation areas.
- **Parkside Wetlands, Des Moines.** Parkside Wetlands is a 14-acre park with natural areas and trails that are covered with a dense mix of deciduous and coniferous forest and wetlands.
- **Salt Air Vista Park, Kent.** Salt Air Vista Park is a 2-acre neighborhood park bordered by the Parkside wetlands on the west. It features play equipment, picnic area, open space, and trails.
- **Linda Heights Park, Kent.** Linda Heights Park is a 4.2-acre park with half-court basketball, picnic table, play equipment, and public art. The park is adjacent and east of I-5 and is buffered from the freeway by a wide stand of mature mixed forest.

3.17.1.2 South 336th Street and South 344th Street Alternatives

The following are within the combined study area for the South 336th Street and South 344th Street alternatives:

- **Cedar Grove Park, Federal Way.** Cedar Grove Park (also known on King County maps as Thompson Park) is a 2.6-acre park with open lawn picnic areas, a play area, and walking trails bordered by natural areas.
- **Town Square Park, Federal Way.** Town Square Park is a 3.9-acre urban community park with amenities, including zip lines, a children's play area, a basketball court, parking, a picnic area, restrooms, and a seasonal splash park.
- **Pacific Rim Bonsai Museum and Rhododendron Botanical Gardens, Federal Way.** Both of these visitor attractions are nonprofit membership organizations on the grounds of the Woodbridge Corporate Park (former Weyerhaeuser corporate headquarters site). Both facilities feature public plant collection garden displays with walking tours and events. The Bonsai garden offers free admission, and the Rhododendron Garden charges entry fees or is free with

Although outside the study area, the 3.8-mile BPA Trail connects many key parts of Federal Way. There is potential for future expansion of the trail into the combined study area of these alternatives.

The Belmor Park Golf & Country Club is located on a 63-acre parcel east of I-5 and south of S 324th Street. This short, par-3 golf course is for residents only and not open for public use.

3.17.2 Environmental Impacts

3.17.2.1 No-Build Alternative

Under the No-Build Alternative, impacts to parks and recreational resources from construction or operation of OMF South would not occur. FWLE will not affect parks or recreation facilities near the Midway Landfill. Other planned projects could potentially affect this resource, depending on their location. Because TDLE would open after OMF South, impacts associated with TDLE that would overlap with OMF South, such as the mainline tracks that would connect to the South 336th Street and South 344th Street alternatives, are addressed within the build alternative impacts discussion below. All other TDLE-related impacts are addressed in Chapter 4, Cumulative Impact Analysis.

3.17.2.2 Long-Term Impacts

Impacts Common to All Build Alternatives

Long-term impacts include permanent changes to a resource, such as when a project converts land from a park or recreational resource to another use. While long-term impacts generally refer to permanent changes, some construction impacts can be considered long term if they would have a major effect on the resource and extend for many years. Long-term impacts also potentially include noise, visual, or other impacts from project operations.

None of the build alternatives would cause long-term impacts to parks or recreation facilities within the study area, either by altering those properties or through noise or visual impacts to those facilities.

3.17.2.3 Construction Impacts

Impacts Common to All Build Alternatives

The project alternatives are not expected to have direct construction impacts on any park or other recreational resources. For parks and trails near construction activities, access could be affected by detours and street or lane closures and by increased congestion caused by construction traffic. Visual impacts, light, glare, dust, and noise could also affect users in some of the parks and trails, although most of these impacts would affect only small portions of the parks closest to the OMF site or mainline track being constructed. Visual and noise impacts during construction from onsite construction or from construction traffic along haul routes would be temporary and would not inhibit park use. It is possible some parks in the study area would experience emissions and airborne dust during construction; however, with implementation of controls required for construction activities and consistent use of BMPs to minimize on-site emissions, construction activities would not be expected to substantially affect air quality.

Midway Landfill Alternative

Parks near the Midway Landfill Alternative are separated from the site either by SR 99 on the west or I-5 on the east. Noise vibration and visual effects from normal operation of these major travel ways would serve to reduce awareness of construction impacts at the parks.

South 336th Street Alternative

Construction of the mainline would require some utility relocations on S 333rd Street in Federal Way, which is the street used to access Cedar Grove Park. During that work, access to Cedar Grove Park from the east may be affected by a detour or lane closure, but access from the west would be maintained.

South 344th Street Alternative

Impacts for the South 344th Street Alternative would be the same as those described above for the South 336th Street Alternative.

3.17.2.4 Avoidance and Minimization of Impacts

Measures to minimize construction impacts would include public outreach to provide information on temporary closures or detours, on-site signage describing the duration and type of temporary impacts, detour signage, temporary ADA improvements (for example, temporary curb ramps for detour routes that do not currently include curb ramps for existing sidewalks), and similar strategies to ensure the continued use and enjoyment of affected park facilities.

BMPs, avoidance and minimization of impacts measures, or mitigation measures identified in this Draft Environmental Impact Statement for other resources (visual and aesthetics, air quality, water quality, neighborhoods, noise and vibration, and transportation) would also reduce the potential effects on affected parks and recreational resources and their users.

3.17.2.5 Indirect Impacts

No indirect impacts related to parks and recreational resources would result from construction and operation of the proposed project.

3.17.3 Potential Mitigation Measures

No adverse impacts to parks or recreation facilities would occur, therefore no mitigation is required.