CHAPTER 5.7 Ecosystems

The Tukwila to Renton Project will permanently fill approximately 7.5 acres of wetlands and temporarily disturb an additional acre. The filled wetlands will be replaced at the Springbrook Creek Wetland and Habitat Mitigation Bank, which will provide higher quality wetlands than those filled by the project.

Permanent effects to stream channels will cover about 1.7 acres of channel area with another 1.5 acres being affected temporarily. WSDOT is planning to mitigate some of these effects by implementing the Panther Creek Watershed Rehabilitation Plan. Additional mitigation will be provided for effects in other basins.

The introduction of new pavement by the project is expected to displace about 34 acres of potential wildlife habitat. Wildlife species are likely to relocate to other portions of the study area or outside the study area.

Rolling Hills Creek in Renton

Please refer to the Tukwila to Renton Project Ecosystems Discipline Report in Appendix I for a complete discussion of the ecosystems analysis.

Healthy ecosystems are essential to the wellbeing of all living things. Ecosystems provide the habitat and life sustaining essentials for plants, animals, and people. Streams, wetlands, and upland areas contribute to clean air, clean water, rainwater retention, and the reduction of flooding.

How did WSDOT identify and evaluate ecosystems in the study area?

Biologists on the I-405 Team collected existing information on ecosystems resources in the study area by reviewing available literature and previous WSDOT studies; performing internet searches; and conducting interviews with various state, county, and local agencies. The biologists collected additional information on the quantity and quality of baseline ecosystems resources by delineating wetlands, surveying streams and rivers, and identifying vegetation types and wildlife habitat in the study area.

Wetlands

The I-405 Team evaluated potential effects to wetlands using wetland information gathered in the field, coupled with an overlay of the project footprint. Project engineers reviewed the wetland mapping, compared it to the project footprint, and calculated permanent and temporary wetland losses using computer-aided design software. Effects to wetland buffers were calculated by evaluating the project's temporary and permanent construction effects that will occur within the regulated wetland buffers. In addition, the team evaluated each affected wetland to determine whether the extent of the effects will alter the overall function and viability of each wetland.

Aquatic Resources

The I-405 Team evaluated the effects on aquatic resources by reviewing information gathered on aquatic resources in the study area and by assessing project design data and WSDOT construction practices. This information was then reviewed to identify potential changes to the study area's aquatic resources' size and functions during and following project construction. Similar to wetlands, potential permanent and temporary effects to aquatic resources from the project were calculated by overlaying the project footprint on a map with the streams and rivers in the study area.

Wildlife and Vegetation

The I-405 Team evaluated the effects of the project on wildlife habitat by comparing the project's temporary and permanent construction areas to wildlife and vegetation information collected from the Washington State Department of Natural Resources National Heritage Program and Washington State Department of Fish and Wildlife Priority Habitat and Species databases, from resource agency biologists, and from reconnaissance-level field surveys. A geographical information system (GIS)-based land cover analysis, including reconnaissance-level surveys to verify the accuracy of the GIS data, was performed. This analysis determined the extent of existing upland vegetation and impervious surface in the study area. Data from these sources were converted into a single land cover GIS map.

The I-405 Team then overlaid the project footprint on the land cover GIS dataset to quantify the amount of upland vegetation

and documented sensitive wildlife species that the project will affect. In addition to direct effects, the team also worked with noise and stormwater experts to determine the extent of potential effects to wildlife species and habitat as a result of new noise or stormwater stemming from the project.

What ecosystems are located in the study area?

Wetlands

Wetland biologists identified 22 wetlands totaling approximately 94 acres within the study area for the Tukwila to Renton Project. Wetlands identified in the study area are typically associated with streams, hillside seeps, or drainage ditches that receive road runoff and convey stormwater.

Locations of the wetlands studied in this EA are shown in Exhibits 5-34 through 5-36. The wetland numbers show the milepost where the wetland is relative to the highway, and the letters indicate if the wetland is on the left side of the freeway (L), the right side of the freeway I, or in the freeway median (M).

Aquatic Resources

The Tukwila to Renton Project is primarily located in the lower Green River subwatershed of the Green-Duwamish River watershed (Water Resource Inventory Area [WRIA] 9) with the northernmost extent of the project extending into the Renton reach of the Cedar River subwatershed in the Lake Washington Watershed (WRIA 8).

Exhibit 5-34: Tukwila to Renton Project Wetlands Sheet 1

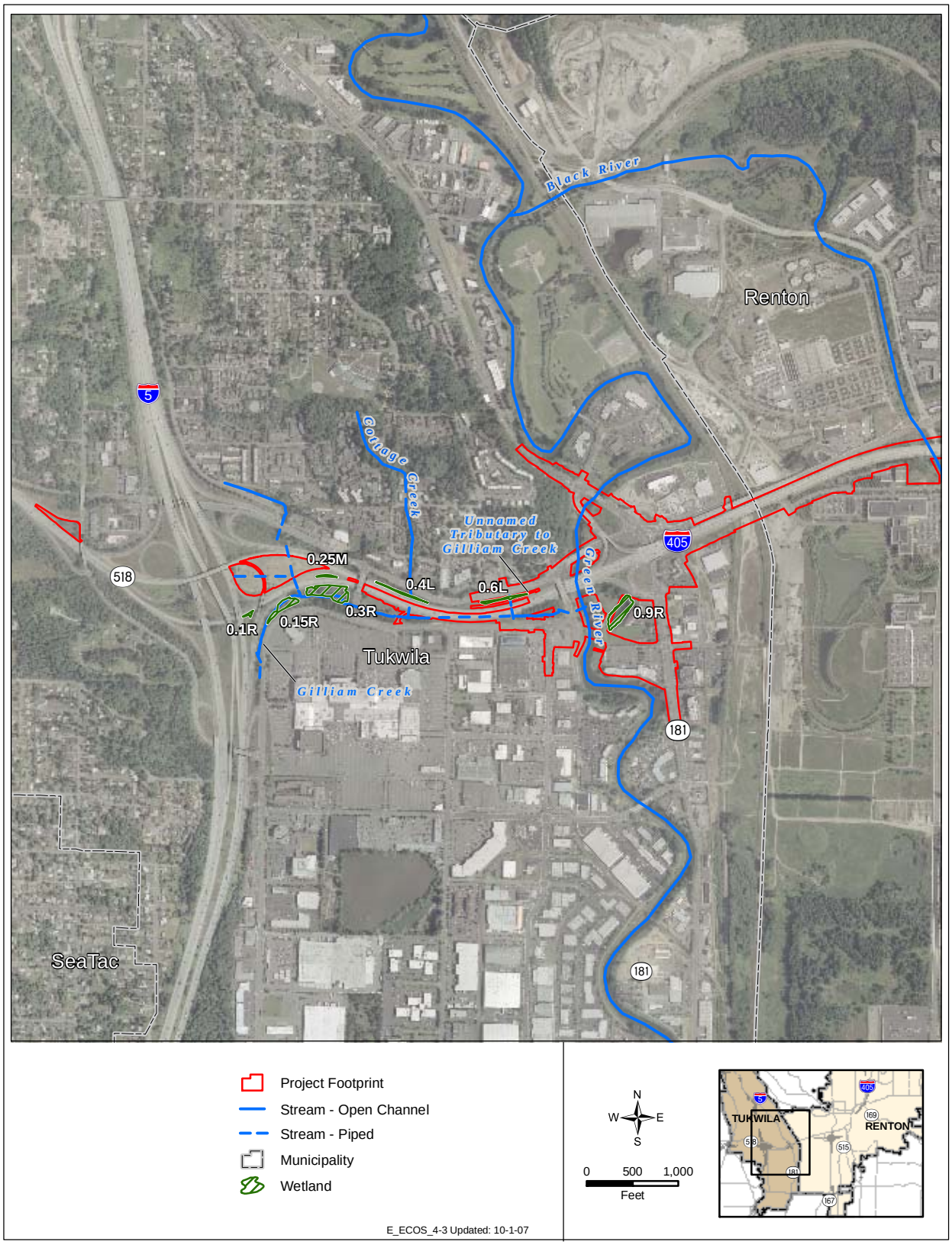


Exhibit 5-35: Tukwila to Renton Project Wetlands Sheet 2

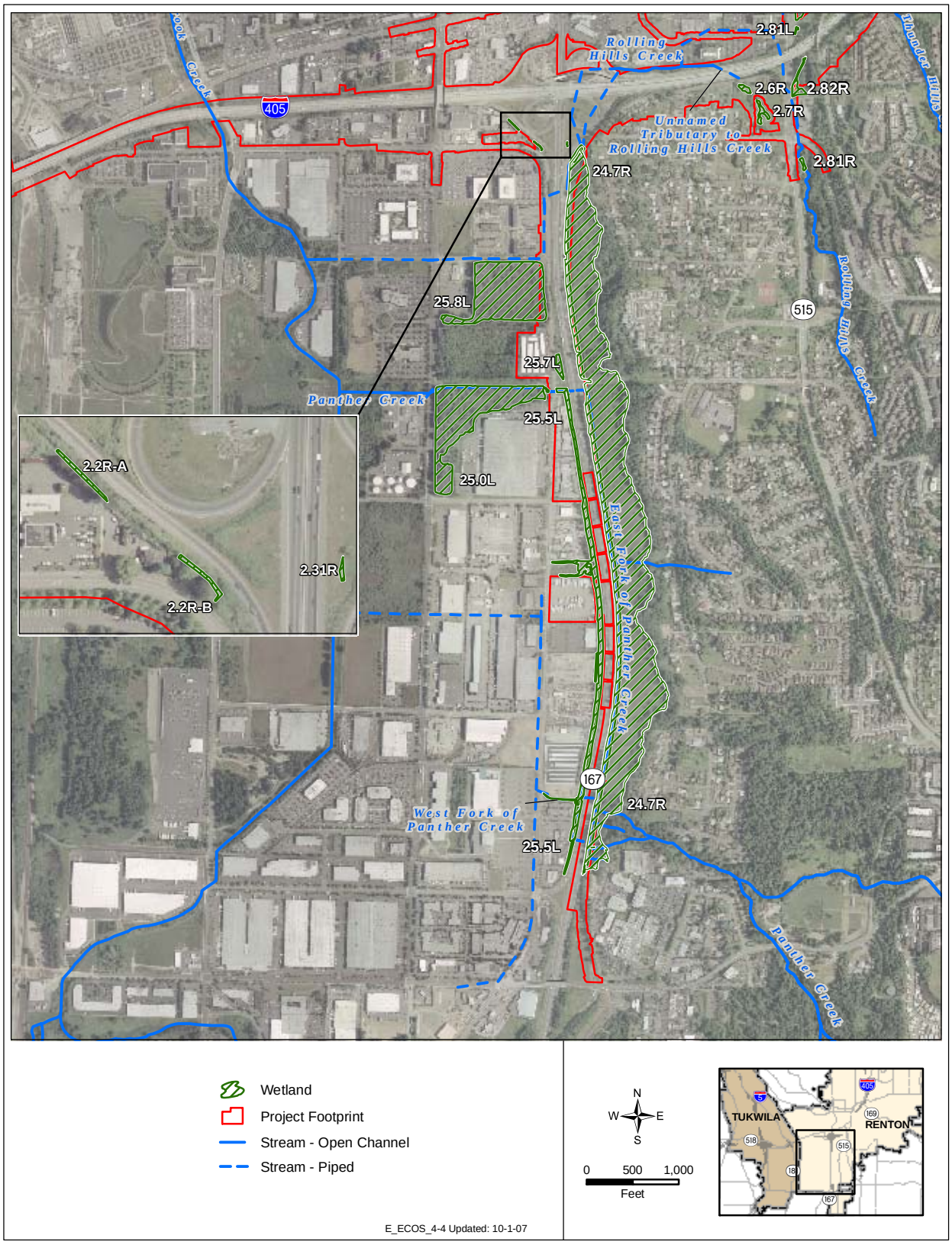
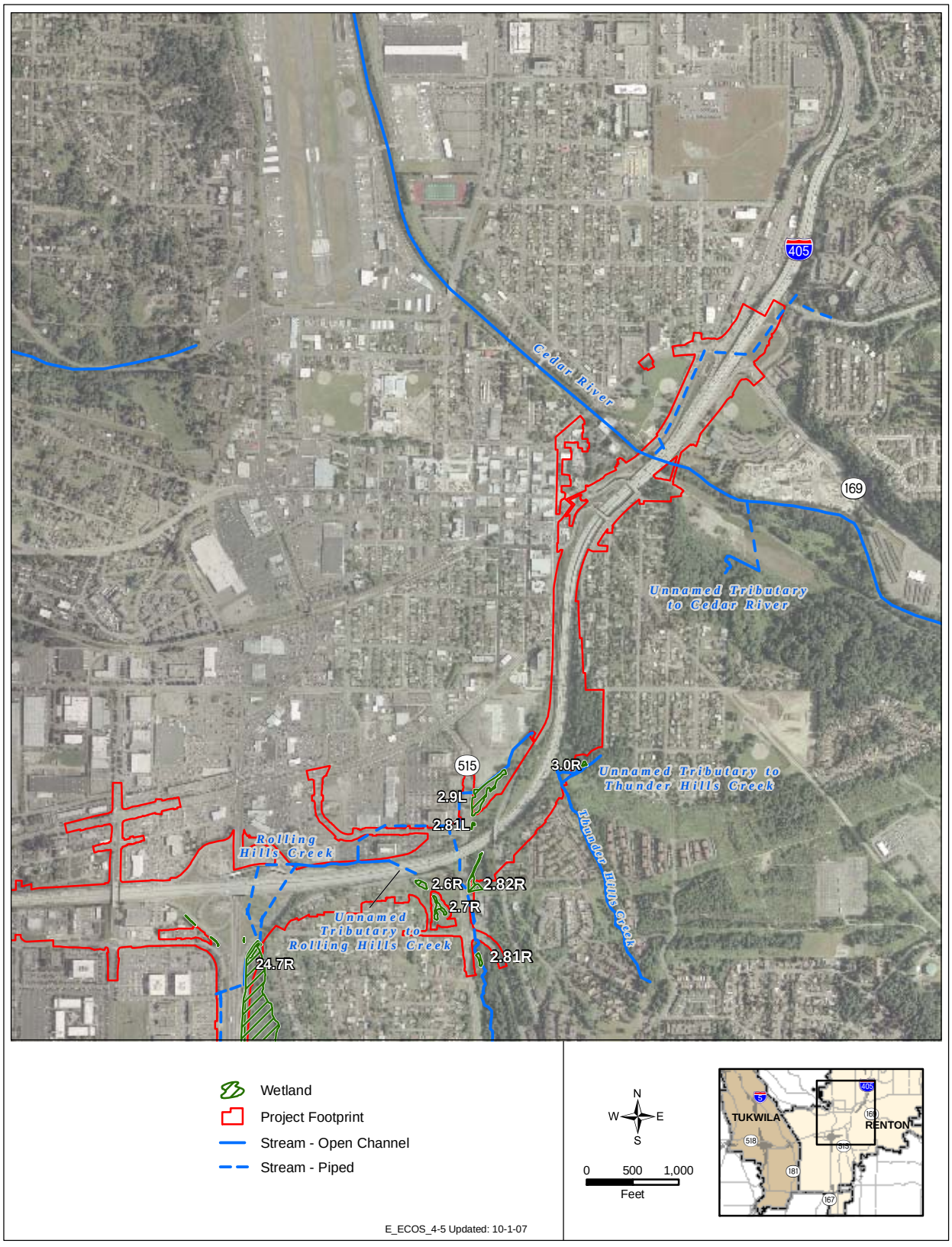


Exhibit 5-36: Tukwila to Renton Project Wetlands Sheet 3



The rivers and streams in WRIA 9 that are crossed by I-405, SR 167, or are otherwise in the vicinity of the study area are Gilliam Creek, an unnamed tributary to Gilliam Creek, Cottage Creek, the Green River, Springbrook Creek, Panther Creek, Rolling Hills Creek, an unnamed tributary to Rolling Hills Creek, Thunder Hills Creek, and an unnamed tributary to Thunder Hills Creek. Two waterbodies in WRIA 8 are within the study area: the Cedar River and an unnamed tributary to the Cedar River.

In general, the rivers and streams in the study area have been highly altered from their natural states to accommodate residential, commercial, and industrial land uses. This alteration has included bank hardening, such as installing riprap and placing streams in concrete channels; reducing or removing streamside vegetation; straightening stream channels; removing in-stream habitat, and introducing barriers to fish passage. These alterations have also resulted in loss of the historic floodplains associated with most of these waterbodies. Significant changes have occurred in the vegetation surrounding these waterbodies. What was once predominantly mature native vegetation has been replaced by a mix of immature native vegetation and non-native invasive plant species.

WSDOT has identified 10 existing culverts that convey waters of the state. These have been determined to be fish bearing, and where in-water work will occur as a result of the project. Of these 10 culverts, WSDOT has determined that seven of them are existing fish passage barriers.[10] These fish passage barriers occur on Panther Creek, Rolling Hills Creek, an unnamed tributary to Rolling Hills Creek, and Thunder Hills Creek. The remaining three culverts are presently fish passable. WSDOT will address fish passage at the culverts per the Memorandum of Agreement between WSDOT and the Washington State Department of Fish and Wildlife. Exhibit 5-37 details the 10 fish bearing culverts owned by WSDOT and associated with in-water work.

[10] *WSDOT, 2007a*

Exhibit 5-37: Fish Bearing Culverts owned by WSDOT and Associated with In-water Work

Stream Conveyed	Culvert Type	Culvert Length (ft)	Upstream Habitat (lf)*	Fish Passable	Barrier Description
Gilliam Creek	108 inch CMP	1,103	600 to 800	Yes	N/A
Gilliam Creek	108 inch CMP	207	1,300 to 2,600	Yes**	N/A
Rolling Hills Creek	48 inch CONC	551	10,200***	No	Temporal barrier based on velocity
Rolling Hills Creek	132 inch CMP	918	10,200***	No	Pipe exceeds velocity criteria at high fish passage design flow
Unnamed Tributary to Rolling Hills Creek	30 inch CONC	281	200	No	Pipe exceeds velocity and water depth criteria at high fish passage design flow
Thunder Hills Creek	48 inch CONC	466	100	No	Pipe exceeds velocity criteria at high fish passage design flow
Panther Creek	24 inch CMP	155	2,600	No	Pipe exceeds velocity criteria at high fish passage design flow
Panther Creek	30 inch CMP	153	2,600	No	Pipe exceeds velocity criteria at high fish passage design flow
Panther Creek	72 inch Steel	189	7,100	No	Temporal barrier based on velocity
Rolling Hills Creek	3-foot by 4-foot box	265	N/A**** (fish passable)	Yes	N/A

- All habitat gains are approximations based on field reconnaissance and are rounded to the nearest hundred foot increment.

** A large metal flap gate (which controls high flows) and a splash pad are located at the end of this culvert. The flap gate and splash pad on downstream end of the culvert prevent fish from moving up or downstream when it is closed. This culvert is owned by the City of Tukwila (Gilliam Creek Basin Stormwater Management Plan, http://www.ci.tukwila.wa.us./pubwks/gilliam.pdf).

*** These culverts both carry the main flow of Rolling Hills Creek underneath the I-405/SR 167 interchange. As such, they must be considered together for purposes of fish passage. One culvert is an overflow culvert and only conveys flow during high flow events.

**** No upstream habitat length is identified for this culvert as it is presently fish passable and all known upstream habitat is presently available.

CMP = corrugated metal pipe CONC = concrete ft = feet lf = linear feet

All native species of salmonids can be found in the study area, including Chinook (*Oncorhynchus tschawytscha*), coho (*O. kisutch*), chum (*O. keta*), pink (*O. gorbuscha*), and sockeye salmon (*O. nerka*); steelhead trout (*O. mykiss*); and sea-run cutthroat trout (*O. clarki clarki*). In addition, bull trout (*Salvelinus confluentus*), Dolly Varden (*S. malma*) (hereafter referenced synonymously with bull trout), and resident cutthroat trout (*O. clarki*) are known to use the waterbodies in the study area. Anadromous salmonid species primarily use the rivers and streams in the study area for upstream and downstream migration and rearing. The study area also contains limited spawning habitat for Chinook, coho, pink,

sockeye, and chum salmon and steelhead. Resident cutthroat trout use the study area for all life stages.

Other fish species likely to be found in the study area include threespine stickleback (*Gasterosteus aculeatus),* longnose dace (*Rhinichthys cataractae*), speckled dace *(R. osculus),* longfin smelt (*Spirinchus thaleichthys*), prickly sculpin (*Cottus asper),* riffle sculpin *(C. gulosus),* reticulated sculpin *(C. perplexus*), shorthead sculpin *(C. confuses*), torrent sculpin *(C. rhotheus*), largescale sucker (*Catostomus macrocheilus*), pacific lamprey *(Lampetra tridentate),* river lamprey *(L. ayresi),* and western brook lamprey *(L. richardsoni).* Exhibits 5-38 and 5-39 detail the anadromous and resident fish species known to occur in the individual streams and rivers in the study area.

Exhibit 5-38: Anadromous Fish Species Known or Presumed to be in the Study Area

	Chinook Salmon	Coho Salmon	Pink Salmon	Sockeye Salmon	Chum Salmon	Steelhead Trout	Bull Trout	Sea-Run Cutthroat	Pacific Lamprey
Gilliam Creek	√	√				√		√	√
Cottage Creek									
Unnamed Tributary to Gilliam Creek									
Green River	√	√	√	√	√	√	√	√	√
Springbrook Creek	√	√				√			
Panther Creek	√	√				√			
Rolling Hills Creek									
Unnamed Tributary to Rolling Hills Creek									
Thunder Hills Creek									
Unnamed Tributary to Thunder Hills Creek									
Cedar River	√	√		√		√	√		
Unnamed Tributary to Cedar River									

Exhibit 5-39: Resident Fish Species Known or Presumed to be in the Study Area

	Fish Species								
	Cutthroat Trout	River Lamprey	Western Brook Lamprey	Sculpin	Longnose Dace	Speckled Dace	Largescale Sucker	Threespine Stickleback	Longfin Smelt
Gilliam Creek	√	√	√	√	√	√	√	√	
Cottage Creek	√		√	√	√	√	√	√	
Unnamed Tributary to Gilliam Creek									
Green River	√	√	√	√		√	√	√	
Springbrook Creek	√		√	√		√	√	√	
Panther Creek	√		√	√	√	√	√	√	
Rolling Hills Creek	√		√	√	√	√		√	
Unnamed Tributary to Rolling Hills Creek				√				√	
Thunder Hills Creek	√		√	√				√	
Unnamed Tributary to Thunder Hills Creek									
Cedar River	√	√	√	√		√	√	√	√
Unnamed Tributary to Cedar River	√			√				√	

Several of the rivers and streams in the study area contain various life stages of Chinook salmon, steelhead, and bull trout, which are currently listed as threatened under the Endangered Species Act (ESA). Critical habitat areas for Chinook salmon and bull trout are also present in the study area.

Waterbodies in the study area known to be used by Chinook salmon include the Green and Cedar Rivers and Springbrook Creek. It is also likely that some smaller waterbodies in the study area support certain Chinook salmon life stages, such as Gilliam Creek, and the lower reaches of Panther Creek. Chinook salmon primarily use the portions of these waterbodies that are in the study area for upstream and downstream migration and rearing; however, substrate conditions in the Cedar River in the study area could provide some limited spawning habitat. The Chinook salmon found in these waterbodies are a part of the Puget Sound evolutionarily significant unit of Chinook salmon, listed as threatened under ESA.

What is an evolutionarily significant unit?

An evolutionarily significant unit of a fish species is the term used by National Marine Fisheries Services for the population protected by a listing under the Endangered Species Act.

Historically, bull trout were reported to use the lower Green River in "vast" numbers.[11] However, bull trout are observed infrequently in this system today. In recent times, bull trout have been reported on the lower Green River from the mouth, through the study area, and as far upstream as the mouth of Newaukum Creek at approximately river mile 41. In addition, the Lake Washington system (including the Cedar River), the lower Green River, and the marine areas of Puget Sound have been identified as containing important foraging, migration, and overwintering habitat necessary for bull trout recovery.

Waterbodies in the study area known or anticipated to be used by steelhead include the Green and Cedar Rivers and Gilliam, Springbrook, and Panther Creeks, though it is likely that some smaller waterbodies in the study area also support certain steelhead trout life stages. The steelhead trout found in these waterbodies are a part of the Puget Sound distinct population segment) of steelhead trout. The National Marine Fisheries Service (NMFS) has concluded that critical habitat cannot be determined at this time for the Puget Sound steelhead trout.

What is a distinct population segment?

A subgroup of a vertebrate species that is treated as a species for purposes of listing under the Endangered Species Act. The subgroup must be separable from the species as a whole yet significant to the species to which it belongs.

[11] *Suckley and Cooper, 1860*

Coho salmon and Pacific and river lamprey (federal species of concern under the ESA) can also be found in the waterbodies in the study area.

Wildlife and Vegetation

Wildlife and upland vegetation was evaluated in an area that extends out one-half mile from both sides of the highway. I-405 biologists identified five categories to describe upland vegetation found in the study area. The five categories include wetlands and four land cover types: forested, shrubs and grasses, maintained vegetation, and impervious surface or area. Land cover in the study area totals approximately 5,785 acres.

The associated acreages and percentages of land cover types in the study area, and typical percentages of these land cover types in the watersheds in the study area, are listed in Exhibit 5-40.

Exhibit 5-40: Baseline Land Cover In the Study Area

Land Cover	Baseline Land Cover in Study Area (acres)	Percentage of Land Cover in Study Area (percent)	Typical Percentage of Land Cover in Green River, Springbrook, and Cedar River Watersheds*
Forested	550	9%	19%
Shrubs and Grasses	251	4%	6%
Maintained Vegetation	1,550	27%	6%
Impervious Surface	3,434	60%	46%
Total	5,785		

* Within 5 miles of the project footprint

No federally listed upland species are known to inhabit the study area. The U.S. Fish and Wildlife Service (USFWS) website shows that ESA-listed species, including Canada lynx (*Lynx canadensis*), gray wolf (*Canis lupus*), marbled murrelet (*Brachyramphus marmoratus marmoratus*), northern spotted owl (*Strix occidentalis caurina*), golden paintbrush (*Castilleja levisecta*), marsh sandwort (*Arenaria paludicola*), grizzly bear

(*Ursus arctos horribilis*), or fisher *(Martes pennanti)* could occur in King County; however, there are no known occurrences of and no suitable habitat exists for these species in the study area.

How will project construction temporarily affect ecosystems?

To build the Tukwila to Renton Project, construction activities will need to occur in and adjacent to wetlands, streams, and their associated buffers. In addition, construction activities will also occur in areas containing wildlife habitat. Project biologists worked with project engineers to identify where improvements would potentially affect the ecosystems' resources. Prior to finalizing the project footprint, WSDOT modified the design, where feasible, to reduce or avoid effects to wetlands, streams, their associated buffers, and upland habitat. When one of these ecosystem elements was located within the construction footprint, WSDOT changed the footprint to avoid the element or, if the element could not be avoided, WSDOT determined to what degree project construction will affect ecosystem elements. Based on this information, WSDOT incorporated measures into the project to minimize or mitigate the identified effects. These measures are described in Section 6.

WSDOT has also prepared a Biological Assessment for the project in compliance with Section 7 of ESA that addressed potential adverse effects to listed species. On March 3, 2008, WSDOT received concurrence with the determination from NMFS and USFWS that the project "is not likely to jeopardize the continued existence of Puget Sound Chinook salmon and Puget Sound Steelhead and is not likely to destroy or adversely modify designated Puget Sound Chinook salmon critical habitat" and "is not likely to jeopardize the continued existence of bull trout".

Wetlands

Six wetlands (approximately 1.1 acres) will be temporarily disturbed. Nine wetlands will also have temporary effects to the buffers (approximately 0.5 acre). See Exhibit 5-41 for temporary effects to wetlands and buffers.

Exhibit 5-41: Summary of Temporary Wetland Effects

Wetland	Wetland Size (acres)	Temporary Wetland Effects (acres)	Percentage of Wetland Incurring Temporary Effects (%)	Wetland Buffer Size (acres)	Temporary Buffer Effects (acres)	Percentage of Wetland Buffer Incurring Temporary Effects (%)**
0.6L	0.17	0.00	0%	0.63	0.08	13%
0.9R	1.00	0.03	3%	1.70	0.06	4%
2.7R	0.25	0.00	0%	1.03	0.02	2%
2.82R	0.38	0.02	5%	1.22	0.02	2%
2.9L	1.05	0.03	3%	0.74	0.03	4%
24.7R	61.00*	0.83	1%	25.90	0.08	1%
25.0L	4.51	0.05	1%	3.92	0.08	2%
25.5L	11.38*	0.00	0%	4.41	0.02	1%
25.8L	11.50	0.08	1%	3.42	0.02	1%
Total	11.5*	1.1***	1%	42.97	0.5***	1%

*The size of these wetlands was estimated as the majority of their area lies outside of the study area. The total wetland acreage includes both the estimates and actual wetland survey data. This total represents only those wetlands that are affected by the Tukwila to Renton Project.

**Wetlands with less than 1 percent disturbance are rounded up to 1 percent.

***The total temporary effects in this table have been rounded to the nearest tenth of an acre.

Aquatic Resources

Project construction will have several temporary effects on aquatic resources. These temporary effects are primarily related to construction-related in-water disturbances and stream diversions, in-stream sedimentation, and stream buffer and riparian vegetation. Streams that will be temporarily affected by project construction are the Green River, Gilliam Creek, Rolling Hills Creek, an unnamed tributary to Rolling Hills Creek, Thunder Hills Creek, Panther Creek, an unnamed tributary to Thunder Hills Creek, and the Cedar River.

Construction activities over, in, or near a stream can disturb fish, other aquatic species, and aquatic habitat. Except where absolutely necessary (as in the case of culvert replacements or extensions, and bridge removal and construction), construction equipment will not enter streams below the OHWM. In addition, streams will be dewatered prior to replacing or lengthening culverts. Dewatering and stream diversions could strand or entrain (draw in) fish and create temporary barriers to fish migration. Dewatering of most waterbodies will only occur in localized areas where

construction will take place. Rivers and streams that may need to be dewatered to construct the project include Gilliam Creek, the Green River, Rolling Hills Creek, an unnamed tributary to Rolling Hills Creek, Thunder Hills Creek, an unnamed tributary to Thunder Hills Creek, Panther Creek, and the Cedar River. A summary of the temporary construction effects to aquatic resources can be found in Exhibit 5-42.

Exhibit 5-42: Summary of Temporary Aquatic Resource Effects

	Regulated Stream Buffer (feet)	Temporary Effect Below OHWM (square feet)	Temporary Effect to Stream Buffer (square feet)	Temporary Effects from Shading * (square feet)
Gilliam Creek	100	436	3,920	0
Green River	100	57,499	14,810	436
Panther Creek	100	3,050	6,969	0
Rolling Hills Creek	75	436	3,920	436
Unnamed tributary to Rolling Hills Creek	75	436	1,307	871
Thunder Hills Creek	75	436	4,792	0
Unnamed Tributary to Thunder Hills Creek	75	436	6,970	0
Cedar River	100	871	3,049	2,178
Total		64,000**	46,000**	4,000**

*Areas of shading detail only those new areas that will be shaded and do not account for existing shaded areas. The shaded areas represent areas directly below/in the footprint of an overwater structure. Whereas other areas are shaded during a solar day, these are likely the areas where the effects and duration are the greatest.

**Total temporary effects have been rounded to the nearest 500 square feet.

Wildlife and Vegetation

Temporary effects to wildlife species include noise associated with general and localized construction activities. Wildlife species in the study area will be affected by the localized increase in noise levels. Wildlife species disturbed by this localized increase in noise will likely disperse to locations where the noise levels are lower and only return to the disturbed areas when construction ceases. Due to the levels of noise typically associated with the I-405 and SR 167 corridors, noise levels from localized construction activities will decrease

to ambient levels at approximately 1,600 feet away from the construction activity.[12]

In addition to direct effects to wildlife, construction activities will affect the land cover types and associated wildlife habitat in the study area. Temporary effects to land cover are shown in Exhibit 5-43. After the project is complete, these temporarily disturbed areas will be graded and replanted with appropriate native vegetation of the same cover type.

Exhibit 5-43: Potential Temporary Land Cover Loss In the Study Area

Land Cover	Baseline Land Cover in Study Area (acres)	Permanent Land Cover Change (acres)	Percentage of Overall Land Cover Change
Forested	550	6.0	1%
Shrubs and Grasses	251	6.6	3%
Maintained Vegetation	1,550	60.7	4%
Total	2,351	73.3	3%

How will the completed project permanently affect ecosystems in the study area?

Wetlands

Of the 22 wetlands in the study area, 12 wetlands (approximately 7.5 acres) will be permanently disturbed by filling or grading to construct road improvements.

Wetland buffer effects will include permanent effects to the buffers of nine wetlands (approximately 8.1 acres). If a wetland is wholly filled, it is not considered to incur buffer effects. See Exhibit 5-44 for permanent effects to wetlands and buffers. These effects will be mitigated as described in Section 6.

[12] *WSDOT, 2005w*

Exhibit 5-44: Summary of Permanent Wetland Effects

Wetland	Wetland Size (acres)	Permanent Wetland Effects (acres)	Percentage of Wetland Incurring Permanent Effects (%)	Wetland Buffer Size (acres)	Permanent Buffer Effects (acres)	Percentage of Wetland Buffer Incurring Permanent Effects (%)**
0.6L	0.17	0.00	0%	0.63	0.26	41%
0.9R	1.00	0.12	12%	1.70	0.64	49%
2.2R-A	0.03	0.03	100%	0.00***	0.00	0%
2.2R-B	0.03	0.03	100%	0.00***	0.00	0%
2.31R	0.01	0.01	100%	0.00***	0.00	0%
2.6R	0.15	0.15	100%	0.49	0.00	0%
2.7R	0.25	0.00	0%	1.03	0.03	3%
2.81L	0.03	0.03	100%	0.00	0.00	0%
2.82R	0.38	0.17	45%	1.22	0.93	76%
2.9L	1.05	0.06	6%	0.74	0.12	16%
24.7R	61.00*	5.42	9%	25.90	4.23	16%
25.0L	4.51	0.61	14%	3.92	0.87	22%
25.5L	11.38*	0.00	0%	4.41	0.04	1%
25.7L	0.30	0.30	100%	0.34	0.34	0%
25.8L	11.50	0.57	5%	3.42	0.60	17%
Total	11.8*	7.5****	8%	41.47	8.1****	17%

*The size of these wetlands was estimated as the majority of their area lies outside of the study area. The total wetland acreage includes both the estimates and actual wetland survey data. This total represents only those wetlands that are affected by the Tukwila to Renton Project.

**Wetlands with less than 1 percent disturbance are rounded up to 1 percent.

***City of Renton wetlands less than 2,200 square feet (0.05 acre) are exempt from regulation under RMC Critical Areas Regulations (RMC 4-3-50 B(7)).

****The total permanent effects in this table have been rounded to the nearest tenth of an acre.

Aquatic Resources

As a result of the project, new roadways and roadway structures (e.g., bridges and culverts) will be built within, over, or near river and stream habitats that support fish and other aquatic species within the study area. Project elements that will permanently affect aquatic resources include:

- Constructing one new bridge and reconstructing five additional bridges over the Green River to accommodate roadway widening, including installation of piers below the OHWM of the Green River.

- Constructing a new stormwater outfall to the Green River.
- Encroaching into the OHWM of Rolling Hills Creek to accommodate I-405, SR 167, and local roadway improvements.
- Encroaching into the OHWM of Thunder Hills Creek to accommodate I-405 roadway improvements including construction of a retaining wall.
- Reconstructing three bridges over the Cedar River, including a pedestrian bridge, and relocating the BNSF Railroad bridge.
- Reconstructing stormwater outfalls to the Cedar River.
- Encroaching into the OHWM of Panther Creek between SR 167 and East Valley Road in order to expand SR 167 to the west.
- Encroaching into the OHWM of Panther Creek on the east side of SR 167 to accommodate a new northbound SR 167 auxiliary lane.

Some project elements will have positive effects on aquatic resources such as:

- Removing the Houser Way bridge over the Cedar River to accommodate widening of I-405.
- Removing the existing pier within the OHWM that supports the pedestrian bridge over the Cedar River. Removal of this pier will only occur if needed for project mitigation.
- Constructing new stormwater facilities for the treatment of water quality and quantity associated with new impervious surfacing created by the project. For more information on stormwater facilities, see the *Water Resources Discipline Report* for this project in Appendix S.

Permanent effects to aquatic resources from the project include effects from new or reconstructed over-water structures, permanent structures placed within existing waterbodies, stream buffer encroachment, and stormwater runoff that could affect stream flow and water quality. A summary of the permanent effects to aquatic resources can be found in Exhibit 5-45. These effects will be mitigated as described in Section 6.

Exhibit 5-45: Summary of Permanent Aquatic Resource Effects

	Regulated Stream Buffer (feet)	Permanent Effect Below OHWM (square feet)	Permanent Effect to Stream Buffer (square feet)	Permanent Shading Effects from New Over-water Cover (square feet)*
Gilliam Creek	100	1,742	46,174	0
Green River	100	16,553	121,532	16,988
Panther Creek	100	45,738	36,590	0
Rolling Hills Creek	75	4,792	33,106	5,227
Unnamed Tributary to Rolling Hills Creek	75	871	12,632	871
Thunder Hills Creek	75	2,614	37,462	0
Unnamed Tributary to Thunder Hills Creek	75	495	4,356	0
Cedar River	100	436	25,700	14,375
Total		73,500**	318,000**	37,500**

*Areas of shading detail only those new areas that will be shaded and do not account for existing shaded areas
**Total permanent effects in this table have been rounded to the nearest 500 square feet.

WSDOT has identified seven existing fish passage barriers where in-water work will occur. These fish passage barriers occur on Panther Creek, Rolling Hills Creek, an unnamed tributary to Rolling Hills Creek, and Thunder Hills Creek.

Wildlife and Vegetation

The constructed project will result in approximately 58 acres of new net impervious surfacing in the study area and an associated reduction of other land use cover types and associated habitats. The permanent loss of approximately 34 acres of potential habitat will affect wildlife species in the study area. Permanent removal of vegetation will eliminate habitat currently available to wildlife species. Wildlife species are likely to migrate to other portions of the study area or outside the study area to find usable and available habitat. The permanent effects to wildlife habitat are shown in Exhibit 5-46.

Exhibit 5-46: Potential Permanent Land Cover Loss In the Study Area

Land Cover	Baseline Land Cover (acres)	Permanent Land Cover Change (acres)	Percentage of Overall Land Cover Change
Forested	550	1.7	1%
Shrubs and Grasses	251	3.1	1%
Maintained Vegetation	1,550	29.2	2%
Total	2,351	34.0	2%

How will project operation affect ecosystems in the study area?

No additional negative effects on wetlands, aquatic resources, or wildlife habitat are expected during operation of the Tukwila to Renton Project. Some wetlands, streams, and rivers within the study area are currently affected by routine vegetation maintenance to meet safety and operation standards as set forth by WSDOT. Wetland and riparian areas located within the right-of-way and presently subject to routine maintenance activities would likely continue to be affected by these practices and conditions.

What would happen to the ecosystems if WSDOT did not build this project?

The No Build Alternative assumes that the project will not be constructed and WSDOT would continue with ongoing maintenance activities in the study area.

Wetlands

The No Build Alternative would have no new permanent, temporary, or indirect effects on wetlands in the study area. No wetland or wetland buffer would be filled or cleared under this alternative, and there would be no change to current management of stormwater flows or existing wildlife habitat functions.

Wetlands in the study area that currently receive untreated runoff would likely continue to be affected by these conditions. Water quality improvements anticipated from the Tukwila to Renton Project would not be realized. It is possible that emission-reducing improvements in automobiles or increases in traffic volumes could change the concentrations of pollutants and contaminants entering these wetlands; however, there is no means to accurately predict that such changes would occur.

Aquatic Resources

With the No Build Alternative, no physical changes would occur to the rivers and streams from construction activities, though some disturbance to stream buffers may occur through routine maintenance activities such as mowing or brushing. The amount of untreated stormwater entering these waterbodies from I-405, I-5, SR 181, SR 167, SR 169, and Talbot

Road would remain unchanged from baseline. It is possible that emission-reducing improvements in automobiles or increases in traffic volumes could change the concentrations of pollutants and contaminants entering these streams; however, there is no means to accurately predict that such changes would occur.

The No Build Alternative would not increase impervious surface areas. For this reason, it is assumed that the No Build Alternative would result in little change to baseline water quality in, and increased flow into, the streams and rivers in the study area. This alternative would not change the existing effects on fish and other aquatic organisms and the habitats in which they live.

Wildlife and Vegetation

The No Build Alternative would have no permanent, temporary, or indirect effects on wildlife and land use cover types in the Tukwila to Renton Project study area. No cover types would be fragmented, cleared, or converted under this alternative, and there would be no change to current baseline wildlife habitat functions.

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