Wetlands

Wetlands provide important functions that serve both the built and natural environments. They support fish and wildlife, store rain and flood waters, recharge groundwater, and remove sediments and pollutants from stormwater runoff.

In considering the environmental impacts of the Sunrise Project, it is important to know where the wetlands are located and what functions they serve so that impacts among alternatives and design options can be compared and potentially reduced.

The Wetlands Technical Report provides details on the following:

- Wetland delineation methodology.
- Wetland characterization and acreages.
- Wetland functional capacity.
- Proposed mitigation planning strategy.

Wetlands in the Project Area

Wetland biologists reviewed previous studies, maps, and aerial photographs and visited most of the property within the "API." The API consists of all of the project area within the construction impact limits, so it includes not only permanent roadway, bridges, and water quality features, but also temporary construction areas.[30] They mapped over 41 acres of wetlands at 14 sites within the Sunrise Project right-of-way or temporary (construction) impact area. Most of the wetlands belong to one or a combination of three main types or classifications: palustrine emergent (PEM, 26.8 acres), palustrine scrub-shrub (PSS, 12.1 acres), and palustrine forested (PFO, 1.4 acres). The classifications are based on the characteristics of the wetlands. The palustrine emergent type indicates wetlands dominated by herbaceous vegetation. Scrub-shrub and forested wetlands often take longer to establish, provide more functions, and are therefore considered more valuable and difficult to replace.

Palustrine wetlands (commonly called marsh, swamp, bog, fen, or prairie) may include small shallow ponds and are found near lakes, rivers, and estuaries or in isolated catchments or on slopes. They are distinguished from riverine and lacustrine (lake) wetlands because vegetation areas are greater than open water.

Palustrine emergent (PEM) wetlands are dominated by herbaceous, hydrophytic (water tolerant), and often perennial vegetation that is present most of the growing season in most years.

Palustrine forested (PFO) wetlands include areas dominated by woody vegetation that is at least 6 meters (20 feet) tall.

Palustrine scrub-shrub (PSS) wetlands are dominated by woody vegetation less than 6 meters (20 feet) tall that may include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.

Figure 48 identifies the 14 wetlands with letters "A" through "N" and shows their locations, types, general characteristics, and approximate boundaries inside the API. The numerous creeks that drain to Mount Scott Creek and the Clackamas River are also shown on Figure 60, some of which are connected hydrologically to the wetlands.

The I-205 Interchange area contains Wetlands A, B, C, D, E, F, G, and H, with most of the acreage near the KEX radio tower, Seventh-Day Adventist Church, and Camp Withycombe properties. The Midpoint area has a small wetland, near SE 130th Avenue and a large area (Wetland J) near Sieben Creek and the Clackamas River. The remaining larger wetlands (K and L) are found near the Rock Creek Junction.

In general, historical land clearing and urban development have significantly altered natural

[30] *The API equates to the 'footprint' of Alternatives 2, 3 and design options, unless specifically noted as the API of the Preferred Alternative.*

drainages in the API by rerouting and placing them in ditches, culverts, and pipes. A large portion of the API is covered by impervious surfaces (roofs and pavement), which prevent stormwater from entering the ground and recharging the groundwater systems, some of which feed local wetlands. The health of wetlands declines as their recharge declines over time, and invasive and non-native plant species can take over from native species, in turn limiting habitat values for native wildlife. Many of the emergent wetlands, the dominant type of wetland in the API, contain a number of invasive plant species.

Amount of Wetlands Affected

Table 25 summarizes loss of wetland acreage by wetland classification for **Alternatives 2** and **3** and the **design options**.

Alternative 1–No Build has the potential for minor impacts to wetlands when planned projects are built that would be far less than the effects associated with building the proposed Sunrise Project. Most of the projects under **Alternative 1** would widen existing roads that could potentially encroach on small wetlands adjacent to the roadways. To obtain a permit from the U.S. Army Corps of Engineers (USACE) and the Oregon Department of State Lands (DSL), each project must avoid wetlands if possible, minimize impacts to unavoidable wetlands, and mitigate the impacts to the affected wetlands. While the impacts associated with the individual projects might be small, the cumulative effects of the impacts of all the projects upon wetland functions in the watershed area would need to be considered for every project. Figure 49 and Figure 50 identify wetland impacts for **Alternatives 2** and **3** and the six design options, respectively.

Alternatives 2 and **3** would both remove the same amount of wetlands, 32.3 acres, leaving less than 9 acres of the total 41 acres within the Sunrise Project area. Although **Alternative 2** has a larger footprint at the midpoint, that difference would not affect any wetlands.

Alternatives 2 and **3** would impact all 7 acres of Wetland C inside the API, though the wetland extends outside of it. Wetland C was ranked as the highest functioning of all 14 wetlands (see the discussion in the following Wetland Functions section). Large acreage impacts would also occur to other notable wetlands (A, F, G, I, J, K, and L).

All of Wetland B within the API (1.4 acres) would be lost; however, a portion of the site outside the API would be left intact. Wetland M would not be affected by **Alternatives 2** and **3**.

Table 25. Wetland Acreage Loss, Total and by Wetland Classification

	Total Acres Lost	PFO	PFO/ PSS	PSS	PSS/ PEM	PEM
Alternatives 2 and 3	32.3	0.5	9.7	0.5	1.4	20.2
Design Option A-2	27.2	0.5	9.3	0.5	1.4	15.5
Design Option B-2	34.4	0.5	11.0	0.6	1.4	20.9
Design Option C-2	28.6	0.5	6.1	0.5	1.4	20.2
Design Option C-3	26.2	0.5	6.7	0.7	1.4	17.0
Design Option D-2	31.6	0.5	9.7	0.5	1.4	19.5
Design Option D-3	32.2	0.5	9.7	0.5	1.34	20.1
Preferred Alternative	22.9	0.9	4.0	0.5	1.4	16.2

See the call-out box on of the first page of the Wetlands Section for a description of wetland classes.

The choice of design option would affect the overall loss of wetland acreage as follows:

- **Design Option A-2** would have about five fewer acres of impact, mostly in the emergent wetland category.
- **Design Option B-2** would result in the greatest loss of wetlands, about two acres more than under **Alternative 2**, and it includes the most mixed forested/scrub-shrub wetlands.
- Both **Design Options C-2** and **C-3** would result in fewer total wetland impacts than

under **Alternatives 2** and **3** (**C-2** by about four acres and **C-3** by about six acres). **Design Option C-2** would affect the least amount of mixed forested/scrub-shrub wetlands.

- **Design Option D-2** would have slightly fewer impacts in the emergent wetlands category than **Alternatives 2** and **3**.
- **Design Option D-3** would have slightly higher impacts on wetlands than **Alternatives 2** and **3**, also in the emergent wetlands category.

The **Preferred Alternative** will impact 22.9 acres of wetlands (Table 25, previous page, Figure PA-46). This is fewer acres than any of the other alternatives and design options. Following publication of the SDEIS and in the development of the **Preferred Alternative**, the North Lawnfield Extension was shifted eastward to avoid impacts to the KEX site. Because the KEX site also includes wetlands, the shift to the east had the additional beneficial effect of reducing the number of acres of wetlands affected. Additional efforts were made as the **Preferred Alternative** was refined to avoid and minimize potential impacts identified during the evaluation of **Alternatives 2** and **3** and the design options.

Wetland Functions

Alternatives 2 and 3

Wetlands in the Sunrise Project area provide about 11 different functions that can be grouped under three main categories: water quantity, water quality, and fish and wildlife habitat. Water quantity function refers to a wetland's ability to store stormwater or flood waters and then delay their release. Water quality functions refer to a wetland's ability to stabilize and store sediments, regulate the cycling of nutrients such as phosphorous and nitrogen, and regulate water temperatures. Fish and wildlife functions refer to a wetland's ability to provide the food sources, habitat structures, and other critical factors for fish and wildlife during some or all of their various life stages.

Table 26 lists the percent loss of wetland functions and acreage that would occur from each design option. Cells highlighted in blue note the greatest percent loss calculated for each function and percent loss of wetland acreage. Cells highlighted in green note the least percent loss calculated for each function and percent loss of wetland acreage. It is important to compare the impact results in Table 25 with those in Table 26 because, although the percentage loss of a function may be very high, the original function provided may have been very low to begin with. This is the case for the thermoregulation and resident fish habitat support functions. Functions were rated on a scale of zero to one (0.0 to 1.0) in one-tenth increments so that their values could be compared.

Most wetlands within the Sunrise Project area ranked as having moderate to moderately low functional capacity. However, several individual wetlands have functions that scored high to moderately high, including Wetlands A, B, and C near I-205 and the Lawnfield Road area, Wetlands F and G at Camp Withycombe, and Wetlands L and M near Rock Creek and the Clackamas River.

Wetland A, located on the west side of SE 82nd Avenue and associated with Phillips Creek, scored highest or tied highest on 4 out of 13 functions, but it is only 0.32 acre. Wetland A is part of a larger wetland and riparian complex that extends outside the Sunrise Project area and to Phillips Creek, a tributary to Mount Scott Creek. Wetland A's trees, native plants, connection to off-site habitats, and seasonal ponding and flooding make its functions rank high. However, the functions are limited by the nearness of SE 82nd Avenue and other development and by the presence of a hazardous waste remediation site.

Table 26. Summary of Acreage Impacts on Wetlands Functions (percent)

Alternative/ Design Option	Percent Acreage Impact[1, 2]	Water Storage and Delay	Sediment Stabilization and Phosphorous Retention	Nitrogen Removal	Primary Production	Invertebrate Habitat Support	Amphibian and Turtle Habitat	Wintering and Migratory Water Bird Support	Songbird Habitat Support	Support of Characteristic Vegetation
Alternatives 2 and 3	78%	77%	78%	77%	76%	78%	78%	78%	77%	78%
Option A-2	66%	61%	64%	62%	65%	64%	61%	60%	59%	60%
Option B-2	83%	81%	83%	82%	82%	83%	82%	82%	81%	82%
Option C-2	69%	73%	70%	70%	65%	70%	69%	72%	71%	71%
Option C-3	63%	67%	65%	65%	59%	65%	65%	67%	66%	67%
Option D-2	76%	75%	77%	75%	75%	77%	76%	76%	75%	76%
Option D-3	78%	77%	78%	77%	76%	78%	77%	78%	77%	78%

[1] Percent acreage impact refers to percentage of wetland acreage within API that would be directly impacted.
[2] Functions with an acreage weighted average score of 0.0 (i.e., Thermoregulation, Resident and Anadromous Fish Habitat Support, and Breeding Water Bird Support) are not included in the table, since percent functional loss scores would be misleading).
Green denotes lowest percentage loss of function for each function or lowest percentage acreage loss.
Blue denotes highest percentage loss of function for each function or highest percentage acreage loss.
Option with greatest loss (acreage and functional) is shown in blue.
Option with least acreage loss is shown in green. Option with least functional loss is also shown in green.

NOTE: Because the **Preferred Alternative** covers an area that is different from **Alternatives 2** and **3** and the design options, wetland impacts cannot be directly compared. Table 27 summarizes the impacts of the **Preferred Alternative** on individual wetlands.

Wetland C straddles the border between the KEX and Seventh-Day Adventist Church properties. It received the highest score, or tied for highest score, in 7 of the 13 functions evaluated; it is also the second largest wetland. What makes Wetland C an important resource is its diverse plant community, complex microtopography, and abundant puddles, as well as its location next to other wetlands and upland habitats outside of the API. Its habitat functions are limited by field mowing on the KEX site and by development encroaching on its margins.

Wetland F at Camp Withycombe has two notable features—relatively large patches of palustrine-forested/palustrine scrub-shrub habitat (2.4 acres in the API for **Alternatives 2** and **3** and 1.2 acres in the API for the **Preferred Alternative**) and emergent wetland with an abundance of common camas, once an important food source for indigenous people but no longer widespread in the region. Wetland G also has a camas meadow. Aside from common camas, however, most of the vegetation within the emergent plant communities of Wetlands F and G is not native.

Wetland I near SE 130th Avenue receives cold water from groundwater and cools local streams during hot summer months. The wetland is believed to connect hydrologically to either Cow Creek or Sieben Creek via pipes underneath developed areas.

Wetland J, at the east end of the Midpoint area, scored relatively low, but its larger size and connection to the upland wildlife corridor to the north are important. However, when the biologists were visiting the area, the site was being cleared and the forested and scrub-shrub plant community may no longer exist.

Wetland K did not score high because of its past use as pasture and the high dominance by non-native grasses. However, in the API for **Alternatives 2** and **3**, Wetland K does provide a relatively large area (3.4 acres) of undeveloped habitat within a larger area of undeveloped upland habitats along Rock Creek.

Wetland L contains 1.9 acres of palustrine-forested/palustrine scrub-shrub habitat in the API for **Alternatives 2** and **3** and the **Preferred Alternative**. Palustrine-forested/palustrine scrub-shrub habitat), is uncommon in the API and surrounding areas. Because it borders a tributary to Rock Creek, it provides thermoregulation and supports resident and anadromous fish habitats. The lower reaches of Rock and Trillium Creeks provide sensitive spawning and rearing fish habitat.

As it relates to wetlands, **microtopography** refers to small-scale changes in elevations, typically in inches.

Wetlands B and M were created to mitigate previous impacts to wetlands. Impacting mitigation wetlands could require more mitigation than that required for impacting non-mitigation wetlands.

As Table 26 indicates, the percentage loss of wetland functions is similar to the amount of acreage that would be affected.

Alternative 1 would have minimal impacts to the function of wetlands in the API.

Alternatives 2 and **3** would remove nearly 80 percent of most wetland functions in the Sunrise Project area. All seven acres of Wetland C, ranked as the highest functioning wetland overall, would be removed. Large acreage impacts would also occur to other wetlands with higher functions, such as Wetlands A, F, G, I, J, K, and L.

Wetland B, an ODOT wetland mitigation site, would also be affected. All of the site within the API would be lost (1.4 acres); however, a portion of the site outside of the API would be left intact. Wetland M, another wetland mitigation site within the API, would not be affected by the build alternatives.

Although **Design Option C-3** would result in the fewest impacts to wetland acreage, **Design Option A-2** would result in the fewest impacts

to wetland function. This is primarily because **Design Option A-2** would avoid impacts to wetlands around the KEX and the Seventh-Day Adventist properties, which were identified as providing the highest overall function within the API.

Design Option B-2 would result in the highest percentage loss of function in most of the functional categories analyzed (i.e., **Design Option B-2** contains the most cells shaded in blue in Table 26).

The alignment of **Design Option C-2** would leave more of Wetland J intact and connected to the wildlife corridor to the north compared to **Alternatives 2** and **3** and **Design Option C-3**. However, **Design Option C-2** would result in the complete removal of Wetland M, an existing wetland mitigation site. **Design Option C-3** would have only minor impacts to Wetland M.

Design Option C-3 would shift the new highway alignment substantially to the north near Wetlands J and M. Acreage impacts to Wetland J would be less than under **Alternatives 2** and **3** and **Design Option C-2**. However, the trade-off for choosing **Design Option C-3** would be more impacts to the wildlife corridor to the north and elimination of the connection between the remaining portion of Wetland J and the wildlife corridor. The disruption could adversely affect the flow of water to Wetland J from underground sources.

Design Option D-2 would shift the alignment partially to the south in the general vicinity of Wetlands K, L, and N. This shift results in much less impact to Wetland K compared to other options (i.e., 0.7 acre of impact for **Design Option D-2** versus 1.6 acres for **Alternatives 2** and **3**). This is the only design option that would impact Wetland N, removing it completely. Wetland N rated fairly low for most functions.

Design Option D-3 would have impacts on wetland function similar to **Alternatives 2** and **3**. The change in the project's footprint in **Design Option D-3** would result in slightly less impact to Wetland K compared to **Alternatives 2** and **3** (1.3 acres compared to 1.6 acres). However, **Design Option D-3** would result in the complete loss of Wetland N (0.2 acre), whereas **Alternatives 2** and **3** would avoid Wetland N altogether.

Even if all wetlands in the area are not directly affected by constructing the proposed Sunrise Project, indirect impacts on the functions of the remaining wetlands could still occur. Traffic, removing sources of wetland hydrology, reducing wetland size, and cutting off connections to other viable habitats and wildlife corridors are typical indirect impacts.

For example, additional functional loss to Wetland C could occur as a result of the North Lawnfield Extension under **Alternatives 2** and **3**, which would result in encroachment of high traffic areas onto adjoining low traffic wetland areas (KEX and Seventh-Day Adventist sites). The North Lawnfield Extension would likely adversely affect the connection of Wetland C to the adjacent wildlife corridor (see Biology Section). The North Lawnfield Extension could adversely alter the water source for Wetland C.

The proposed Sunrise Project would go straight through Wetland J, leaving a small patch to the north and a small patch to the south. The northern patch would still connect to the wildlife corridor farther north; however, the new highway would result in a substantial increase in traffic adjacent to both patches. In addition, the water source for the southern patch of Wetland J could be adversely affected.

Preferred Alternative

Because the **Preferred Alternative** covers an area that is different from **Alternatives 2** and **3** and the design options, wetland impacts cannot be directly compared. Table 27 summarizes the impacts of the **Preferred Alternative** on individual wetlands. Figure PA-46 illustrates the wetlands in the **Preferred Alternative** project area.

Table 27. Individual Wetland Impacts (in acres) for the Preferred Alternative

Wetland	Preferred Alternative
A	0.32
B*	1.35
C	5.84
D	3.36
E	0.37
F	2.21
G	0.05
H	0.53
I	0.53
J	5.56
K	0.27
L	1.42
M*	0.88
N	0.22
Total	22.90

*These wetlands are existing wetland mitigation sites.

Under the **Preferred Alternative**, impacts to Wetland C, which has the highest overall functional scores, were reduced by shifting a portion of the Lawnfield Extension eastward and outside of the wetland. Impacts were reduced by 1.3 acres relative to **Alternatives 2** and **3** and the design options that contained the North Lawnfield Extension.

Wetlands B and M, both existing wetland compensatory mitigation sites, will be impacted by the **Preferred Alternative**. Impacts to these wetlands will likely require a high ratio of mitigation.

Impacts to Wetlands D, K, and L have been reduced by up to 2.9 acres relative to impacts calculated for **Alternatives 2** and **3** and the design options as a result of impact avoidance resulting from the use of bridges.

Impacts to Wetland G were greatly reduced, from 1.2 acres down to 0.05 acres, relative to **Alternatives 2** and **3** and the design options by relocating stormwater facilities outside of the wetland.

Impacts to Wetland J fall within the lower range of impacts calculated for **Alternatives 2** and **3** and **the design options**. Although 5.56 acres of Wetland J will be impacted by the **Preferred Alternative**, this number is considerably lower than the roughly 10 to 12 acres of impacts that would have resulted from **Alternatives 2** or **3** with any of the design options.

Only Practicable Alternative Finding: Executive Order 11990, Protection of Wetlands

Executive Order 11990 and 23 CFR 777.3 requires federal agencies to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands on federal projects.

The FEIS for this project describes all the alternatives evaluated for the proposed project as required by FHWA regulation CFR 771.123 (c) and all other applicable regulations related to alternative development. Each alternative that would meet the project's stated purpose and need was analyzed for impacts to wetlands and potential effects on wetland resource functions according to all applicable rules and regulations, and was rejected from further study or advanced for more detailed development, taking into consideration the potential effects of the proposed alternative on wetlands and wetland functions.

As part of the alternative development and analysis process, each alternative that was advanced for further study was assessed for impacts to wetlands and to wetland functions as directed by FHWA Executive Order 11990 and 23 CFR 777.3. The alignment of each alternative was designed or adjusted to best avoid and minimize effects on identified wetlands while still meeting the purpose and need of the project.

The refined alternatives were presented to federal and local resource agencies according to CETAS guidelines for review, evaluation and

concurrence on the range of alternatives that would be advanced for further analysis.

The alternatives that were advanced for further consideration after review and concurrence according to CETAS guidelines were further refined to avoid and minimize impacts to wetland functions and values through incorporating into the design of the **Preferred Alternative** the following design or engineering alternatives:

1) Avoidance through alignment adjustments. The alignments of the **Preferred Alternative** have been adjusted to avoid or minimize impacts to wetlands in the project area as much as possible. Avoidance of all impacts was not possible due to:

    a) The need to make connections to various portions of the project corridor to meet the project's purpose and need; and

    b) The need to meet engineering design standards for safety and constructability.

2) Avoidance and minimization through structural design. The design of the **Preferred Alternative** has incorporated avoidance and minimization measures such as:

    a) Use of structure such as bridges and retaining walls to avoid or minimize impacts to wetlands and/or wetland functions;

    b) Use of engineered/designed fill to avoid or minimize fill that would impact wetlands or affect wetland functions; and

    c) The relocation of non-essential roadway components such as water quality treatment and stormwater detention facilities to areas outside wetland boundaries; and

    d) Maintaining of hydrologic connections, as much as possible in the project area, through the use of culverts and other hydrologic conveyance systems.

3) Mitigating the unavoidable loss of wetlands or impacts to wetland functions by:

    a) Replacing the loss of impacted wetlands or wetland functions through purchasing wetland mitigation credits at an established wetland mitigation bank as required by the provisions of the Clean Water Act; or

    b) Constructing a wetland mitigation site if no wetland mitigation bank credits are available or need exceeds availability.

Based on the need for the Sunrise Project to make specific connections to existing facilities—particularly near I-205 and SE 122nd Avenue where many wetlands are found—to meet the engineering requirements, and given the efforts made to avoid, minimize, and mitigate wetland impacts, it is determined that there is no practicable alternative to the proposed construction in wetlands and that the proposed action includes all practicable measures to minimize harm to wetlands as a result of the Sunrise Project.

Floodplains

Clackamas County regulates development in floodplains. Executive Order 11988 requires analysis of project impacts on floodplains and FHWA regulations (see 23 CFR 650, subpart A) require analysis of impacts on floodplains.

The **Preferred Alternative** crosses several mapped FEMA floodplains and floodways (see Figure PA-25). These crossings are in the lower reaches of Phillips Creek, Dean Creek, Mount Scott Creek and Phillips Creek near I-205 and Trillium and Rock Creek near Rock Creek Junction.

The **Preferred Alternative** for the Sunrise Project will encroach into the floodplain of

Dean Creek just above the confluence of Mount Scott Creek and Dean Creek (Figures PA-25, PA-25A). The proposed bridge for SE 82nd Drive will span the floodway but will require fill of approximately 2.1 acre-feet of the adjacent flood fringe area of the floodplain. An engineering investigation was conducted to see if the required fill would cause a significant impact to the floodplain (a rise of more than one foot of the base flood elevation). The conclusion is that there will be no significant impact. This finding is based on several factors (see memorandum from David Bissell, P.E., dated September 7, 2010, Appendix D). ODOT has concluded that the culverts in the area will require no lengthening, so hydraulically there is no impact to the culverts. Construction of headwalls above culverts along SE 82nd Avenue will ensure no mapped floodways are affected. The fill will not be placed in or otherwise impact the floodway. By definition, the mapped floodways (shown on Figures PA-25A and PA-25B) represent the areas that must be kept free of fill and obstructions to convey the base flood (100-year event) without raising flooding elevations by more than one foot.

In addition, to meet Clackamas County regulations, an equal amount of fill would be removed in the same area. The plan has been presented to and informally accepted by the Clackamas County Floodplain Manager, Steve Hanschka (pers. comm. between 8/30/2010 and 9/7/2010).

The floodplain of Rock Creek will be spanned by bridges that will not affect the mapped floodplains and floodways for these creeks.

At Trillium Creek a culvert analysis for the culverted crossing was conducted. The purpose of the analysis was to determine the appropriate size of culvert needed to ensure that no rise in the floodplain elevation would occur upstream from the OR 224 culvert crossing after the Sunrise Project is built.

Two flows were analyzed, the 500-year (165 cubic feet/second) and the 100-year (147 cubic feet/second). The headwater elevations for these flows are 182 feet and 180 feet for the 500-year and 100-year flows, respectively. The existing culvert is 100 feet long, 36 inches in diameter, and constructed from corrugated metal pipe. The analyzed culvert will be segmented or discontinuous for up to 300 feet and will be constructed of reinforced concrete pipe.

CulvertMaster shows that a 36-inch reinforced concrete pipe culvert would have a headwater elevation of 179.9 feet for the 100-year flow and 184.5 feet for the 500-year flow, thereby meeting a no-rise requirement for the 100-year flow, but not for the 500-year flow. A 42-inch culvert has a headwater elevation of 175.5 feet for the 100-year, and 177 feet for the 500-year flow. Therefore, a no-rise requirement would be met using a 42-inch culvert.

Given that the culvert will be designed to be fish passable, per ODFW Fish Passage Criteria, as well as accommodate 'medium wildlife (e.g., smaller than deer) passage', a larger arch or three-sided box culvert is planned. Such fish and wildlife friendly culverts would be larger than a 42-inch culvert, so a no-rise requirement would also be met in that case.

The proposed culvert will change the hydraulics of the area, hydraulically causing the new construction area to be removed from the floodplain. Consequently, a remapping effort during final design and following construction will be required. Prior to FHWA's authorization of construction, a Conditional Letter of Map Revision (CLOMR) will be filed with FEMA. The CLOMR allows FEMA to comment on proposed projects that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA). The letter does not revise an effective NFIP map; it indicates whether the project, if built as proposed, would be recognized by FEMA. Building permits cannot be issued based on a CLOMR, because a CLOMR does not change the NFIP map.

Once a project has been completed, the local jurisdiction (in this case, Clackamas County) must submit a Letter of Map Revision (LOMR). Analysis may be provided by ODOT or its contractors. The LOMR will result in a revision to the Flood Insurance Rate Map (FIRM) to reflect the project. The LOMR officially revises the FIRM or Flood Boundary and Floodway Map (FBFM), and sometimes the FIS report, and when appropriate, includes a description of the modifications.

Only Practicable Alternative Finding for Executive Order 11988 – Protection of Floodplains

If a project would cause more than a 1-foot net rise in the base flood elevation, Subpart A of 23 CFR 650 requires a finding that the selected alternative is the only practicable alternative.

Because the **Preferred Alternative** will not cause a significant net rise of the floodplains at either SE 82nd Avenue or Trillium Creek crossings, no "Only Practicable Alternative Finding" is required or provided.

Indirect Effects

The loss of wetlands could indirectly affect surface waters downstream of the wetland sites due to the loss of water quantity and water quality functions. Local wildlife would lose those habitats and their links to adjacent upland habitats. If the loss is large enough, regional use by wildlife could decline as viable corridors are broken up.

The Sunrise Project will reduce the amount of land in the area, which could lead to increased pressure to develop within remaining wetlands, as fewer viable upland sites are likely to remain. Due to the project's location within the UGB, many of these same pressures would likely occur even without the Sunrise Project.

Wetland Avoidance, Minimization, and Mitigation Measures for the Preferred Alternative

Avoidance and minimization

Impacts to wetlands and other waters that cannot be avoided must be minimized. The following methods to minimize impacts were used:

- The **Preferred Alternative**, where feasible, has combined design options with the fewest impacts. For example, in some areas (Wetlands F and G in Camp Withycombe) the preliminary design located stormwater facilities in wetlands, which were moved to avoid wetland impacts. In other areas, fill slopes were steepened to minimize wetland impacts.
- Culverts will be used to provide hydrologic connectivity from one side of a roadway to the other for wetlands that would be bisected by a new roadway (see culverts shown on Figures PA-2 and PA-4).
- Culverts will be designed to provide amphibian and small mammal passage where feasible which will help mitigate impacts to wetland wildlife habitat function.
- Fish-passable culverts or bridge structures will be incorporated where appropriate, which will help mitigate impacts to wetland and waterway fish habitat function.

Wetland mitigation

The **Preferred Alternative** API lies entirely within the service area of the Foster Creek Mitigation Bank. Wetland impacts will be mitigated through the purchase of credits at an approved wetland mitigation bank.

Wetland impacts for the **Preferred Alternative** would be 22.90 acres; therefore, 22.90 wetland mitigation credits would be needed. The proposed location for obtaining mitigation credits is the privately owned Foster Creek Mitigation Bank, which has been authorized by the USACE and DSL. A total of 28 credits have

been authorized; however, acreage associated with these credits need to meet set performance criteria before USACE and DSL will release the credits for sale. As of August 4, 2010, 14 credits have been released for sale and four of these credits have already been purchased. Therefore 10 credits are immediately available for sale. An additional seven credits are anticipated to meet performance criteria and be released within the next 12 months, with the remainder of credits likely to be available thereafter.

The bank is also seeking to receive an additional five credits added to the original 28 authorized credits, which would bring the bank total up to 33 credits. These additional five credits relate to wetland creation work already performed and anticipated to meet performance criteria in the next year or so. Lastly, the bank may expand its operations in a year from now. This would require purchase of new property, regulatory reviews, and construction implementation. Therefore, as of the publication of the FEIS, potential new credits from expansion of the bank may be unavailable when planned construction of the Sunrise Project begins.

Twenty-four of the original authorized 28 credits are highly likely to be available for purchase over the next two to three years; however, the Sunrise Project will need to compete against other interests for these credits. Due to the slow economy, the bank has not had any sales in the past 12 months. Although current market demand is very low, the project need for approximately 82 percent of the authorized credits not yet sold (i.e., 22.90 credits needed, divided by 24 credits authorized and not yet sold) could make it difficult to acquire all of the mitigation credits needed by the project at the Foster Creek Mitigation Bank. Also, market demand for mitigation credits is more likely to increase than decrease over the next few years. If the additional 5 credits are authorized, which seems reasonably likely, then the project could potentially need to consume approximately 79 percent of authorized credits not yet sold. This is still a considerably high percentage.

Nevertheless, there is a high probability that the Foster Creek Mitigation Bank could provide a considerable quantity of mitigation credits that would be needed by the project. Additionally, the project could spur expansion of the mitigation bank due to the likelihood of increased demand that would be induced by the project. Also, as noted in the 2010 Wetlands Technical Report, as the **Preferred Alternative** is further refined during the engineering design process, ODOT, in cooperation with DSL and USACE, will evaluate opportunities to incorporate some of the wetland mitigation needs within the project right-of-way.

The Foster Creek Wetland Mitigation Bank is expected to have adequate wetland mitigation credits available to mitigate for the wetland impacts associated with the **Preferred Alternative** for the Sunrise Corridor project. However, if market conditions change before complete build-out of the project, an alternative wetland mitigation plan has been developed. The contingency plan for providing wetland mitigation associated with Sunrise Project impacts is to construct an ODOT-developed wetland mitigation site that will accommodate the wetland mitigation needs for the Sunrise Project.

In 2007, the Clackamas River basin, between the confluence of the Clackamas River with the Willamette River and Estacada, was surveyed using GIS technology for areas that may provide wetland mitigation opportunities. A total of 702.70 acres were identified in the survey area with characteristics for potential wetland mitigation sites. These sites will be reviewed in more detail to select a location for wetland mitigation beyond that available at the Foster Creek Wetland Mitigation Bank, if needed.

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Wetland A (0.32 Acres)
Forested wetland adjacent to west side of SE 82nd along floodplain of Phillips and Mt. Scott Creeks. Phillips Creek flows through wetland just prior to its confluence with Mt. Scott Creek. Adjacent is a hazardous waste groundwater remediation area.

Wetland B (1.36 Acres)
Wetland is ODOT mitigation site adjacent to I-205, office park development, and Dean Creek. Conditions favorable to native frogs.

Wetland C (7.09 Acres)
Most valuable wetland resource within project API, includes diverse plant communities with native species and evidence of deer bedding down. KEX Radio tower portion is emergent wetland. Seventh-Day Adventist property contains emergent and forested/scrub-shrub plant communities.

Wetland D (4.17 Acres)
Patches of remnant wetlands west of KEX Radio tower site and railroad tracks, emergent with small patch of forested/scrub-shrub and high percentage of invasive and non-native species adjacent to ditched section of Dean Creek.

Wetland E* (0.36 Acres)
Emergent wetland of low function due to isolation and high presence of invasive species.

Wetland F (3.65 Acres)
At Camp Withycombe, wetland is mix of emergent and forested wetlands. Water from the ditch flows through center of the wetland and eventually to Dean Creek.

Wetland G (1.66 Acres)
Wetland at Camp Withycombe contains a large population of common camas.

Wetland I (0.64 Acres)
Scrub-shrub wetlands, bordered by industrial facilities, are shallow but wide areas created by draining hillside seeps that provide connection to other natural resource areas.

Wetland J (15.30 Acres)
Estimated wetland acreage and conditions only, not verified. Potential acreage is large and property connects with upland wildlife corridor to north, which helps support wildlife habitat function. Past disturbance from mowing and removal of vegetation and possibly fill in places has reduced acreage.

Wetland K (3.34 Acres)
Emergent wetland lies adjacent to Rock Creek, roughly 40 to 50 feet above active channel. Historically cattle pasture, wetland is dominated by non-native grasses. Visitation by humans is infrequent and the area is relatively well-buffered from other traffic.

Wetland E* (0.36 Acres)
Emergent wetland of low function due to isolation and high presence of invasive species.

Wetland E* (0.36 Acres)
Emergent wetland of low function due to isolation and high presence of invasive species.

Wetland H (0.21 Acres)
Forested wetland is surrounded by development, which severely limits its wildlife support functions.

Wetland M (0.88 Acres)
Wetland mitigation site next to a self-storage facility. Beginning to transition from emergent to a scrub-shrub community. A high percentage of native plant species.

Wetland N (0.22 Acres)
Emergent wetland dominated by non-native grasses but has some native species. Bordered on all sides by development.

Wetland L (2.20 Acres)
Tributary of Rock Creek crosses under OR 224, via culvert near intersection with OR 212, and runs through emergent wetland. Downed trees showed beaver activity along roadway fill slopes of OR 224.

2,000 0 2,000 Feet

Sources:
ODOT and Metro, Portland OR
Streams as modified by DEA as found on field visit, DEA Wetland Boundaries

Legend
- Urban Growth Boundary (UGB)
- Area of Project Impact (API)
- River
- Streams
- Culvert

Wetlands - Cowardin Classifications
- Palustrine Emergent (PEM)
- Palustrine Forested (PFO)
- Palustrine Scrub-Shrub (PSS)
- Palustrine Forested/Palustrine Scrub-Shrub (PFO/PSS)
- Palustrine Scrub-Shrub/Palustrine Emergent (PSS/PEM)

**** Wetland E:** There are four wetlands that share the same characteristics (emergent vegetation, dominated by non-native species, typically in depressions associated with past land development activities). Because they share similar wetland functions, they were grouped together as Wetland E.*

Figure 48

Wetlands and Other Waters in the Area of Project Impact (Aerial)

Sunrise Project, I-205 to Rock Creek Junction

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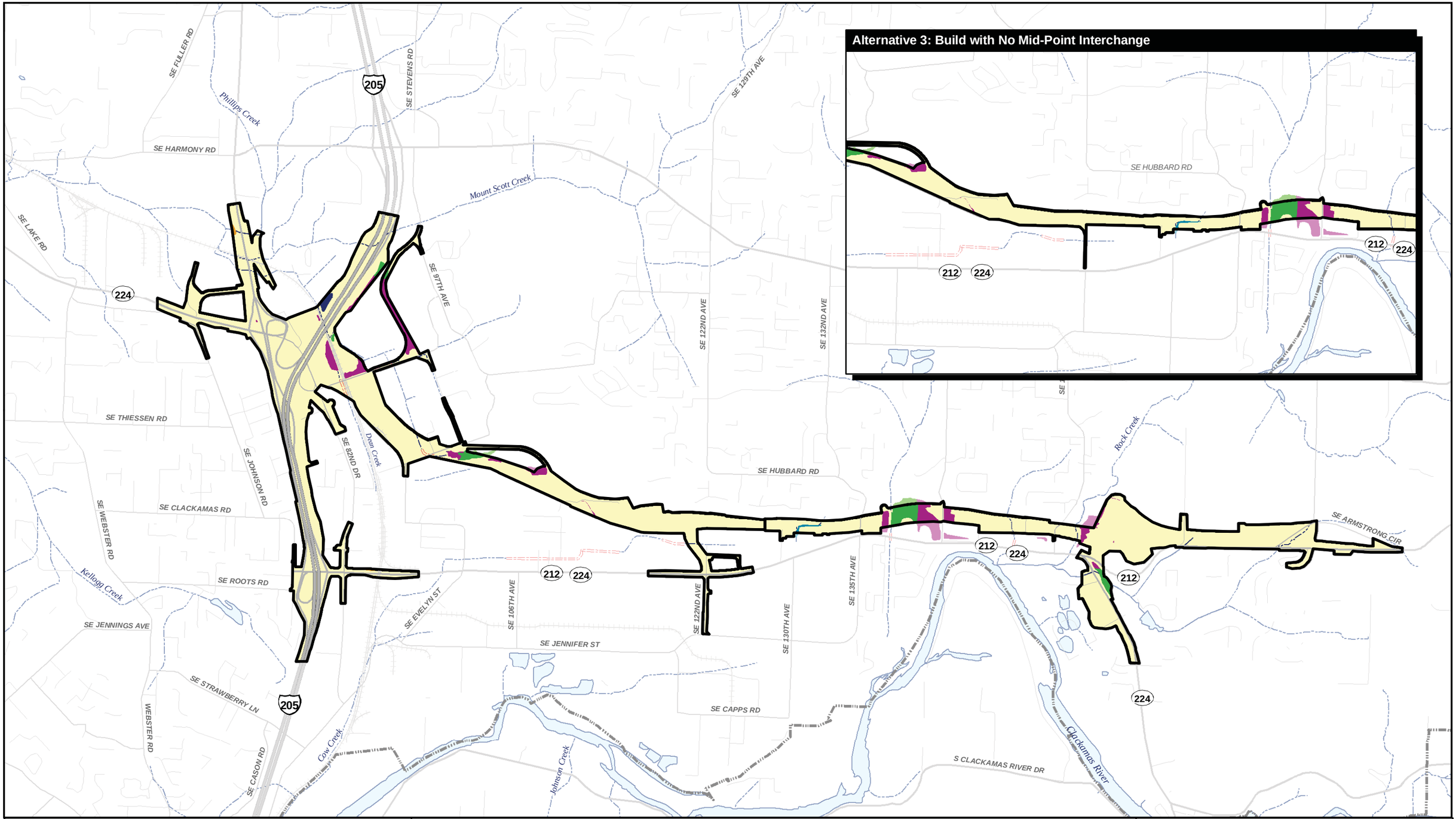


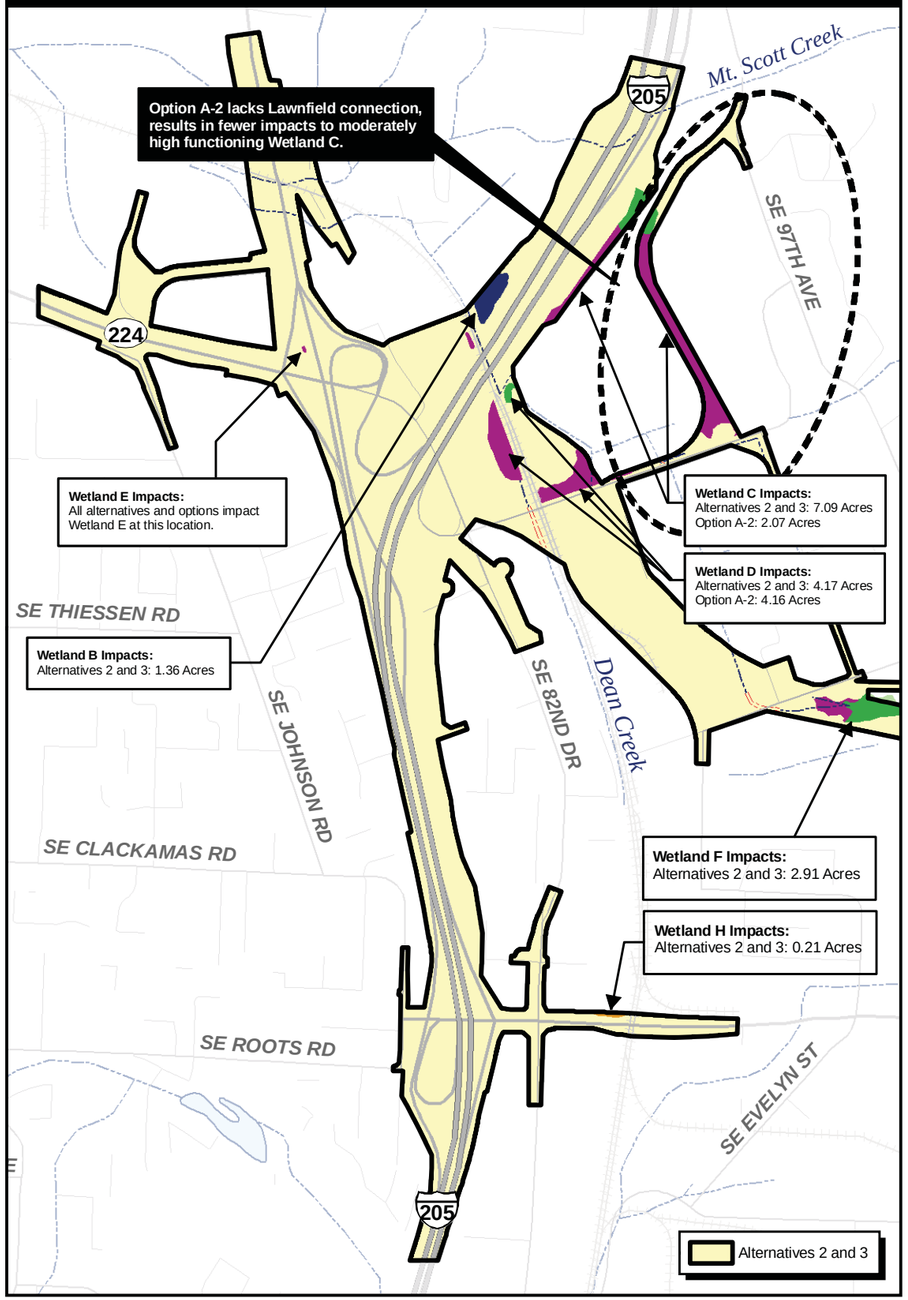
Sources:
ODOT and Metro, Portland OR
Streams as modified by DEA as found on field visit, DEA Wetland Boundaries

Figure 49

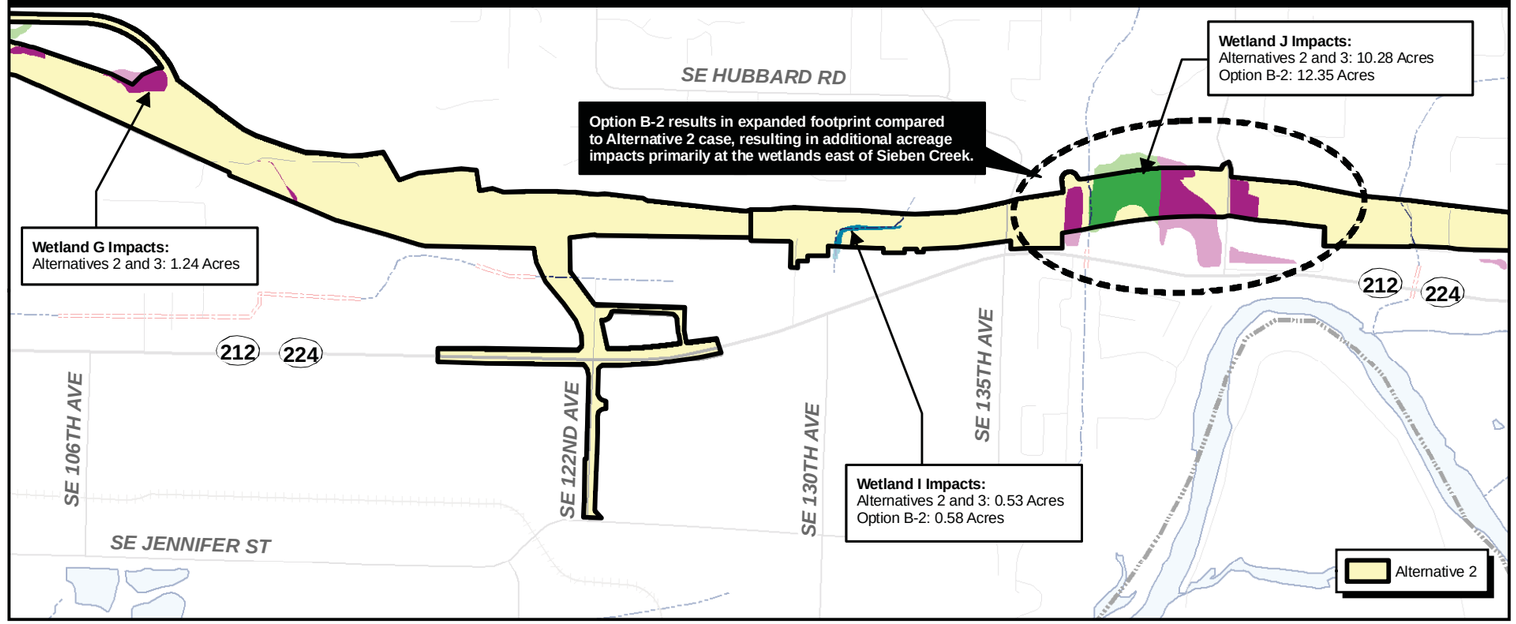
Wetland Impacts for Alternative 2 and Alternative 3

Sunrise Project, I-205 to Rock Creek Junction

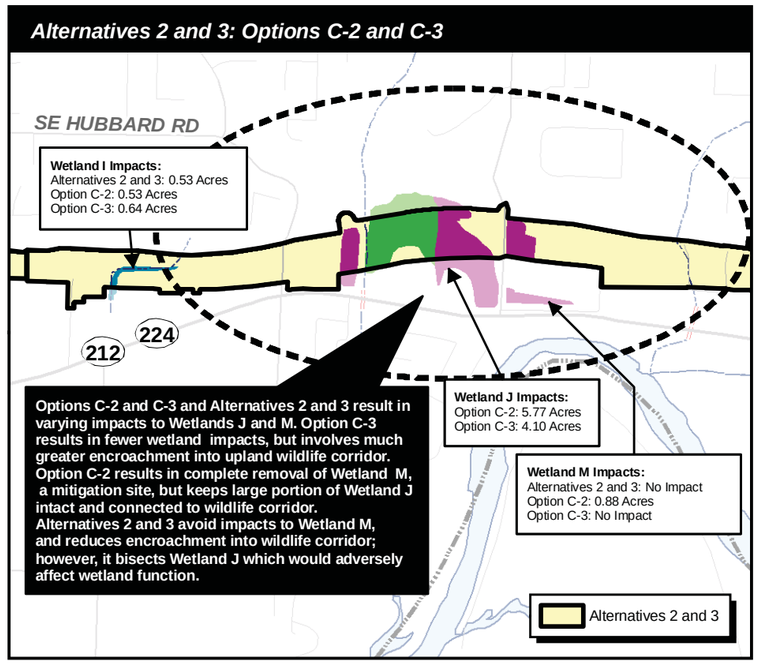
Alternatives 2 and 3: Option A-2



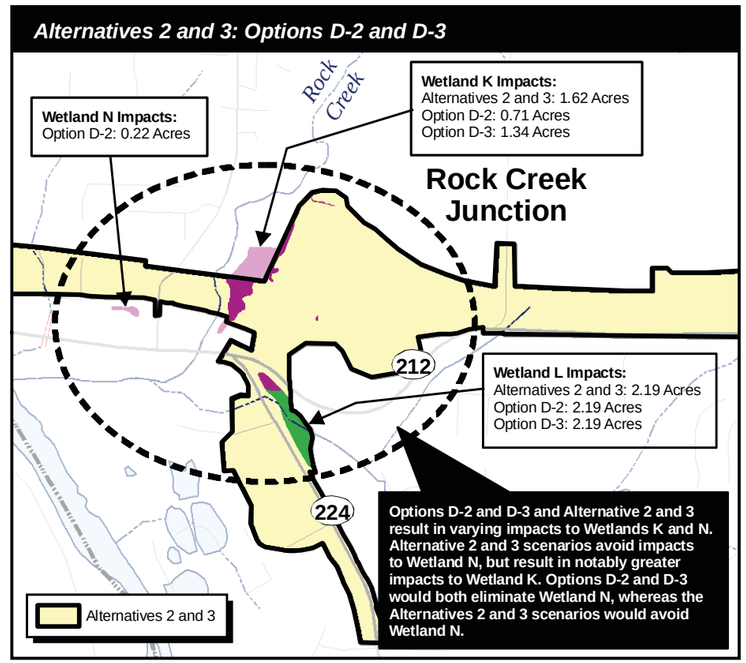
Alternative 2: Option B-2



Alternatives 2 and 3: Options C-2 and C-3



Alternatives 2 and 3: Options D-2 and D-3



1,500 0 1,500 Feet

Sources:
ODOT and Metro, Portland OR
Streams as modified by DEA as found on field visit, DEA Wetland Boundaries

Legend

River
Streams
Culvert

Wetlands - Cowardin Classification

Palustrine Emergent (PEM)
Palustrine Forested (PFO)
Palustrine Scrub-Shrub (PSS)
Palustrine Forested/Palustrine Scrub-Shrub (PFO/PSS)
Palustrine Scrub-Shrub/Palustrine Emergent (PSS/PEM)

Figure 50

Comparison of Wetland Impacts from Design Options

Sunrise Project, I-205 to Rock Creek Junction

Impacts to Wetland C, which received the highest overall functional scores in the project area, were reduced by shifting a portion of the Lawnfield extension alignment to the east, outside of the wetland. Impacts were reduced by 1.25 acres relative to the SDEIS alternatives/options that contained the Lawnfield extension alignment.

New wetland added to Wetland Complex E, not mapped during DEIS and not displayed in previous report figures.

Impacts to Wetland J fall within the lower range of impacts calculated for the various SDEIS alternative/options. Although 5.56 acres of Wetland J will be impacted by the Preferred Alternative, this number is considerably lower than the roughly 10 to 12 acres of impacts that would have resulted from higher impact alternative/option combinations originally evaluated under the SDEIS.

Impacts to Wetlands D, K, and L have been reduced by up to 2.93 acres relative to impacts calculated for SDEIS alternatives/options as a result of accounting for impact avoidance resulting from the use of bridges.

Impacts to Wetland G were greatly reduced, from 1.24 acres down to 0.05 acres, relative to the SDEIS alternatives/options, by relocating stormwater facilities outside of the wetland.

Wetlands B and M, both existing wetland mitigation sites, will be impacted by the Preferred Alternative. Impacts to these wetlands will likely require a high ratio of mitigation.

2,000 0 2,000 Feet

Sources:
ODOT and Metro, Portland OR
Streams as modified by DEA as found on field visit, DEA Wetland Boundaries

Legend

- Area of Potential Impact (API)
- Urban Growth Boundary (UGB)
- River
- Streams
- Culvert

Wetlands

- Wetlands Impacted by PA
- Wetlands Avoided in PA-API

**** Wetland E:** There are five wetlands that share the same characteristics (emergent vegetation, dominated by non-native species, typically in depressions associated with past land development activities). Because they share similar wetland functions, they were grouped together as Wetland E.*

Figure PA-46

Wetlands and Other Waters and Impacts in PA-API

Sunrise Project, I-205 to Rock Creek Junction

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