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**IN LIEU FEE MITIGATION PLAN**  
**BOISE CREEK MITIGATION PROJECT**

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**King County**

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Water and Land Resources Division  
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BOISE CREEK MITIGATION PROJECT**

**Prepared for:**

**US Army Corps of Engineers  
and Washington State Department of Ecology  
as  
Co-chairs of the Interagency Review Team**

*for a project to be implemented by:*

**The King County Mitigation Reserves Program**

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## Executive Summary

The Boise Creek Mitigation Project (BC Mitigation Project) is located on the left bank of Boise Creek downstream of 284<sup>th</sup> Ave SE, southeast of the City of Enumclaw, in unincorporated King County. The BC Mitigation Project site is within the King County In-Lieu Fee Program's White/Puyallup River Service Area. The BC Mitigation Project will re-establish riparian wetland to provide off-channel refuge and enhance riparian upland habitat to maintain shade on Boise Creek. Large wood will increase habitat functions.

The BC Mitigation Project site consists of 5.191 acres. The project will re-establish approximately 2.609 acres of palustrine wetlands, including 0.547 acre of emergent wetland, 0.872 acre of scrub-shrub wetland, and 1.190 acre of forested wetland. 2.35 acres of riparian upland will be preserved and enhanced to provide valuable large tree preservation areas, seed sources, and large wood inputs. 0.202 acre is and will remain below ordinary high-water mark or outside the project footprint and 0.03 acre of floodplain bench will be excluded from credit generation and funded by others.

The BC Mitigation Project is designed to add hydrologically connected wetland, large wood, and other habitat features to improve floodplain function, benefiting fish and wildlife, hydrology, and water quality consistent with needs on Boise Creek identified in watershed planning documents. Complex grading is designed to increase wetland community diversity, high flow connections, backwater connections, and a porous inlet to provide surface water from Boise Creek.

This in-lieu fee mitigation site will offset unavoidable impacts in the White/Puyallup River Service Area. The BC Mitigation Project will be monitored for successful achievement of performance standards for at least 10 years after construction. The BC Mitigation Project will earn up to 67.582 in-lieu fee credits using the Credit/Debit Method. Credits will be released over time as performance standards are met.

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# I. Introduction

## A. Overview

The purpose of this Mitigation Plan is to describe the details of the Boise Mitigation Project (BC Mitigation Project), which will re-establish wetland and enhance riparian upland habitats, preserve mature vegetation, add fish and wildlife habitat through the installation of large wood, and encourage natural functions and processes in this portion of the Boise Creek floodplain (**Figure 1**).

The BC Mitigation Project will be implemented under King County's In-Lieu Fee (ILF) Program, the Mitigation Reserves Program (ILF Program or KC MRP) by King County to provide compensatory mitigation for unavoidable impacts associated with permitted projects elsewhere in the White/Puyallup River Service Area.

King County strives to implement projects that are appropriately designed for the landscape setting for maximum ecological success. Projects are intentionally designed to restore processes and add habitat suitable for fish and wildlife. The BC Mitigation Project site consists of 5.191 acres and will re-establish 2.609 acres of palustrine wetland and preserve and enhance 2.35 acres of supporting riparian upland habitat through actions that increase the connection to Boise Creek (**Figure 2**). 0.202 acre is and will remain below ordinary high-water mark or outside the project footprint and 0.03 acre of floodplain bench will be excluded from credit generation and funded by others. 2.609 acres of the 5.191-acre BC Mitigation Project site will be credit-generating (**Table 1**).

This Mitigation Plan, in its entirety, will be appended to the *King County Mitigation Reserves Program – In Lieu Fee Program Instrument* (King County, 2012).

## B. Impacts Being Mitigated

The BC Mitigation Project will offset all or a portion of impacts associated with the following impact projects:

- King County Wastewater Treatment Division: Kent Auburn Conveyance System Improvements Project Phase B, NWS-2015-245 (a portion of this impact located in the Green River/Duwamish Service Area is offset at Chinook Wind Mitigation Project)
- Sound Transit: Federal Way Link Extension, NWS-2013-687
- MAJ Pacific LLC: MAJ Ellingson and Milwaukee (7-Eleven), NWS-2019-525
- Lakeridge Paving Company: Lakeridge Company Headquarters, City of Auburn FAC20-0006 and GRA19-0024
- Federal Way Parcel A, LLC and Federal Way Parcel B, LLC: Woodbridge Buildings A & B Projects, Ecology AO#20792
- MainVue WA LLC: Diamond Valley Estates, Ecology AO#22948, City of Auburn GRA23-0040

Additional impact projects may be assigned to the BC Mitigation Project with Interagency Review Team (IRT) approval.

### **C. Credit Generation**

The BC Mitigation Project includes 2.609 acres of creditable area. Credit generation will be calculated using the Credit/Debit Method. Approximately 0.547 acre of emergent wetland, 0.872 acre of scrub-shrub wetland, and 1.190 acre of forested wetland will generate credit using the Credit/Debit Method (**Figure 2**). 2.35 acres of riparian upland will provide valuable mature vegetation preservation areas, seed sources, and large wood inputs. Some areas of riparian upland will be preserved for the purpose of the BC Mitigation Project but may be enhanced through underplanting funded by others. Upland areas of the BC Mitigation Project site will not directly generate credit using the Credit/Debit Method unless areas of riparian upland convert to wetland over time. Areas designed as riparian upland that convert to wetland may be proposed as wetland credit areas after approval by the U.S. Army Corps of Engineers (Corps) and Washington State Department of Ecology (Ecology) in consultation with the IRT. Other areas that will not generate credit include 0.202 acre that is and will remain below ordinary high-water mark or outside the project footprint and 0.03 acre of floodplain bench funded by others. Multiple habitat elements such as loose wood clusters, habitat wood piles, floodplain jams, large wood structures, and snags will be constructed and/or placed to create wildlife habitat throughout the BC Mitigation Project site. Some of the large wood elements are funded by others to provide additional habitat benefit that does contribute to credit generation (**Figure 2**). Project elements, along with the perpetual protection of 5.191 acres will produce 67.582 credits calculated using the Credit/Debit Method (**Table 2, Table 7**).

Credit generation at the BC Mitigation Project is intended to offset impacts associated with the projects listed in Section I. B., however, surplus credits generated by the site may be used to offset other impacts in the White/Puyallup River Service Area. Attribution of surplus mitigation credit to impact projects will be coordinated with the IRT.

### **D. Transfer of Obligations**

Responsibility for completing required compensatory mitigation has been transferred to King County via agreements with impact projects listed in Section I. B. through King County's federally and state authorized ILF Program. King County issued a Statement of Sale for each ILF credit purchase. Statements of Sale are on file with the KC MRP, as well as with regulatory agencies.

## **II. Goals and Objectives**

The BC Mitigation Project is designed to meet the following goals and objectives.

### **Goal 1. Establish and protect wetland and aquatic functions at the Boise Creek Mitigation Project site.**

Objective 1.1. Permanently protect riparian, wetland, and aquatic ecosystem functions through recordation of permanent legal site protections.

Objective 1.2. Build project elements according to IRT-approved plans.

### **Goal 2. Establish riverine wetland and aquatic resources within the Boise Creek Mitigation Project site.**

Objective 2.1. Re-establish riverine wetland and aquatic habitats.

Objective 2.2. Establish native vegetation in wetland areas.

Objective 2.3. Enhance and restore upland areas with native vegetation.

Objective 2.4. Maintain the entire Boise Creek Mitigation Project site so that the site is dominated by native vegetation through management of non-native and noxious weeds.

### III. Mitigation Project Overview

King County proposes to re-establish wetland and enhance riparian upland habitat to improve salmon rearing habitat availability and complexity, improve flood refuge, and protect and restore riparian vegetation within the BC Mitigation Project site on Boise Creek. The site consists of two upland parcels (302007-9034 and 302007-9079) (**Figure 1**). The total BC Mitigation Project site is 5.191 acres, with wetland mitigation project components totaling 2.609 acres (**Table 1, Table 2, Figure 2**). Mitigation actions are detailed on the *Boise Creek Mitigation Plan Set* attached to this document (**Attachment 1**) and included by reference.

#### A. Location

The BC Mitigation Project site is located within the Middle White River subbasin in the Puyallup/White River watershed of Water Resource Inventory Area 10 (WRIA 10), southeast of the City of Enumclaw, in unincorporated King County; latitude 47.1852° North, longitude - 121.9652° West (tax parcels 302007-9034 and 302007-9079). The BC Mitigation Project site is located on the left (south) bank of Boise Creek (WRIA 10.0057), at river mile (RM) 3.1, where the confluence with its tributary, Beaver Creek (WRIA 10.0059), is located, and it is accessed from 284<sup>th</sup> Ave SE (**Figure 1**). Boise Creek is a tributary to the White River and discharges into the White River at RM 23.3.

The BC Mitigation Project site is situated along a high-priority tributary that is identified for protection and restoration in the *Salmon Habitat Protection and Restoration Strategy for Puyallup and Chambers Watersheds* (WRIA 10/12, 2018, p.62). It is noted in the *Puyallup-White (WRIA 10) Watershed Restoration and Enhancement Plan (Final Draft)* (Ecology, 2021, p.22) that “the White River spring Chinook is the only remaining spring Chinook salmon stock found in the South Puget Sound” and Boise Creek is one of the locations where documented spawning occurs.

**Table 1 ILF Site Boundary, Non-credit Generating, and Credit Area Acreages**

<b>TYPE</b>	<b>ACRES</b>
Total ILF Site	5.191
Non-Credit Generating Perimeter Buffer	1.876
Other Non-Credit Generating Areas	0.706
Credit Areas	2.609

**Table 2 Proposed Habitat Types and Acreages**

<i>Action</i> <b>Habitat Type</b>	<b>Creditable</b>	<b>Non-Credit Generating Perimeter Buffer</b>	<b>Other Non-creditable Area</b>	<b>Totals</b>
<i>Re-establishment</i> Emergent	0.547	0.000	0.000	0.547
<i>Re-establishment</i> Scrub-Shrub	0.872	0.000	0.000	0.872
<i>Re-establishment</i> Forested	1.190	0.000	0.000	1.190
<i>Enhancement</i> Riparian Upland Enhancement (Upland)	0.000	0.323	0.165	0.488
<i>Preservation</i> Riparian Upland Preservation (Upland)	0.000	1.490	0.372	1.862
Areas Below OHWM <sup>1</sup>	0.000	0.063	0.139	0.202
Floodplain Bench	0.000	0.000	0.030	0.030
<b>Total</b>	<b>2.609</b>	<b>1.876</b>	<b>0.706</b>	<b>5.191</b>
<b>Totals By Habitat Category</b>				
Total Wetland Re-establishment	2.609	0.000	0.000	2.609
Total Upland	0.000	1.813	0.537	2.350
Total Below OHWM	0	0.063	0.139	0.202
Total Floodplain Bench	0	0	0.030	0.030
<b>Total</b>				<b>5.191</b>

<sup>1</sup> Total for Area Below OHWM includes 0.007 acre of parcel located on the right bank of Boise Creek that is functionally excluded from the project footprint.

## IV. Site Selection

As described in the *King County Mitigation Reserves Program – In Lieu Fee Program Instrument* (King County, 2012; “Program Instrument”), the KC MRP selects mitigation sites to address watershed needs as determined through best available science. Mitigation goals in a watershed context in the White/Puyallup River watershed are discussed in the Compensation Planning Framework in Appendix I, Section 7.0 of the Program Instrument. *Ecological*

*Preservation Priorities in the White River Subbasin* (King County, 2009), *Boise Creek Rapid Rural Reconnaissance (RRR) Report* (King County, 2004), and *Salmon Habitat Limiting Factors for the Puyallup River Basin* (Kerwin, 1999) are referenced in the Program Instrument as resources to guide mitigation decisions. The goals inferred from these resources include:

- Protect and restore aquatic habitat: protect and restore natural salmon runs and other aquatic resources, where feasible, by protecting existing high-quality habitat and restoring degraded habitats and improving fish passage;
- Restore and improve riparian habitat;
- Reduce flood hazards and damage: Eliminate the risk that flooding poses to human lives and reduce the economic and property damage from flooding;
- Improve stormwater detention storage;
- Improve water quality;
- Reduce downstream sedimentation; and
- Recruit large wood.

### **A. Site Selection Process**

KC MRP initiated a service area-wide site selection process to evaluate mitigation opportunities in the White/Puyallup River Service Area. This site selection involved identification of the first KC MRP site in the White/Puyallup River Service Area. The search prioritized opportunities in the Hylebos drainage basin to provide compensation that would be proximate to impacts associated with Sound Transit's Federal Way Link Extension impacts. Geographic area experts within King County and staff of cities surrounding Hylebos Creek were interviewed to identify potential mitigation projects. King County staff considered the following to be the key factors in determining potential mitigation receiving sites (listed in order of relative importance):

1. Replacement of functions lost.
2. Ability of a mitigation project to address watershed needs.
3. Feasibility of implementing a project.
4. Geographic proximity of mitigation site to impact sites.

King County staff thoroughly reviewed property ownership and potential mitigation receiving sites with connections to the White River and Hylebos Creek.

### **B. Mitigation Site Options**

KC MRP reviewed publicly owned lands, engaged with other agencies and jurisdictions such as Pierce Conservation District and City of Sumner to explore partnership opportunities, and explored potential of acquiring new land for an ILF site. Priority was given to potential sites within the Hylebos drainage basin, and the search was expanded beyond that after the initial Hylebos drainage basin search failed to identify suitable sites that would be available in a timely manner.

The following sites were considered during the review process:

#### *Pinnacle Peak Park*

Pinnacle Peak Park is a 335-acre public open space owned and managed by King County Parks located at SE Mud Mountain Rd and SE 481<sup>st</sup> Street, southeast of the City of Enumclaw. The potential site is a 35-acre portion of a parcel in the northwest corner of the park (Parcel 362006-9014) where a watercourse flows through an existing wetland.

The site is mostly wetland. Potential mitigation actions would focus on enhancement actions, resulting in very limited wetland credit generation opportunity. Therefore, KC MRP decided to continue analyses of other potential sites.

#### *Milwaukee Ditch*

The potential site is an 8.79-acre parcel owned by the City of Algona (Parcel 362104-9002), southwest of the intersection between Ellingson Road and Pacific Ave N in the City of Algona. The ditch on the property drains into Milwaukee Ditch, a fish-bearing watercourse known to be habitat for several salmonid species.

The entire parcel is within a larger wetland complex and potential mitigation actions would focus on enhancement actions, resulting in very limited wetland credit generation opportunity. Therefore, KC MRP decided to continue analyses of other potential sites.

#### *Equity Group NW*

This potential site consists of two non-contiguous parcels under the same private ownership, totaling approximately 20 acres, immediately adjacent to the White River (Parcels 642700-0435 and 352006-9021). Access to the property for project implementation was a concern. The property is also well-vegetated and potential mitigation actions would focus on enhancement actions, resulting in very limited wetland credit generation opportunity. Furthermore, negotiation for acquisition had not begun at the time of site selection and the timing would not have allowed this to site to be an option. Therefore, KC MRP decided to continue analyses of other potential sites.

#### *Boise Creek*

The Boise Creek site totals 5.191 acres and consists of two tax parcels, 302007-9079 and 302007-9034. The property is located at 46311 284<sup>th</sup> Ave SE, Enumclaw, WA 98022, south of the City of Enumclaw, in unincorporated King County. The property is within the Enumclaw Plateau Agricultural Production District (APD) and is zoned A-35. The property was purchased by King County in 2020 using funds that are compatible with mitigation (Conservation Futures Tax and King County Parks Levy funding).

Boise Creek, a fish-bearing stream, flows along the northern border of the property and Beaver Creek, a tributary of Boise Creek, flows through the center of the west parcel. Their confluence is located within the west parcel. The western portion of the property is forested and has been planted with Douglas- fir (*Pseudotsuga menziesii*) trees, and the eastern portion of the property

includes pasture, a homesite, and agricultural support buildings. The southeastern corner of the property, including 0.708 acre of pasture and a barn, was planned to remain in agricultural uses. The plan to preserve the southeastern corner of the property for agricultural uses was intended to address King County Code 21A.24.381 which requires coordination with the King County Department of Natural Resources and Parks (DNRP) when planning aquatic habitat restoration projects, floodplain restoration projects or projects under the KC MRP that are proposed for a site located within an APD. However, the process to surplus the 0.708 acre of pasture with barn was complicated by several factors including King County Code that will not allow substandard A-35 zoned parcels to decrease in size, funding restrictions that require repayment of the monetary value of the area if sold to a private entity, and limited ability to retain a Farmland Preservation Program easement due to likely incompatible uses of the property by a future landowner. A consensus was reached within King County DNRP that the full property would be used for a mitigation site. The additional gain for salmon habitat and ecological value was determined to be greater than the loss of farming potential.

The Boise Creek site was selected and approved by the King County ILF IRT in 2021. In September 2023, the 0.708-acre pasture originally reserved for agricultural purposes was added to the project. Proposed mitigation actions include excavation of upland areas to create approximately 2.609 acres of wetland, complex grading to increase wetland community diversity, high flow connections, backwater connections, and a porous inlet to provide a surface water connection to Boise Creek. The BC Mitigation Project is designed to be compatible with future expansion of the site.

### **C. Watershed Plans**

The BC Mitigation Project design consists of adding hydrologically connected wetland, large wood, and other habitat features to improve floodplain function, benefiting fish and wildlife, hydrology, and water quality consistent with needs on Boise Creek identified in watershed planning documents. Although mitigation and restoration may be seen as fundamentally different, the Mitigation Rule (Federal Register, 2008) specifies that the watershed approach should be used in planning compensatory mitigation and says, “it would always be preferable to have an appropriate watershed plan”, “developed for the specific goal of aquatic resource restoration, establishment, enhancement, and preservation”. Mitigation project proponents are also encouraged to consult watershed planning documents such as Washington State Department of Ecology’s *Selecting Wetland Mitigation Sites Using a Watershed Approach* which says, “Where relevant watershed plans are available, mitigation sites should be located in areas targeted by those plans for restoring ecological processes” (Hruby, Harper, & Stanley, 2009, p.8).

For the above reasons, watershed plans related to salmon recovery, pollution, flooding, and habitat conservation in Boise Creek and White River were consulted when planning the BC Mitigation Project.

#### **1. Boise Creek Rapid Rural Reconnaissance Report**

The *Boise Creek Rapid Rural Reconnaissance (RRR) Report* (King County, 2004) was prepared to assess and gain a better understanding of drainage systems, streams, and habitat issues in the Boise Creek drainage basin. Based on the analysis of the drainage basin, actions and projects were identified and ranked for surface-water and habitat management.

The BC Mitigation Project is designed to contribute to the following goals and purposes described in the report:

- Restore ecosystem processes: Restore natural flows and sediment regimes to alleviate downstream problems and improve systemwide habitat conditions.
- Restore ecological connectivity: Restore fish passage and habitat through reconnection of isolated/fragmented environments (King County, 2004, p.1-3).

## **2. Lower White River Biodiversity Management Area (BMA) Stewardship Plan**

The *Lower White River Biodiversity Management Area (BMA) Stewardship Plan* (“Stewardship Plan”) was developed as a result of Pierce County’s biodiversity planning, which identified “land areas that provide for a biologically diverse representation of species”, through multi-jurisdictional collaboration (Dvornich & Burgess, 2016, p.i). The mouth of Boise Creek falls within the Lower White River BMA, and it drains into the Lower White River near the City of Buckley. Tributaries of the White River and their associated riparian systems are considered conservation targets in the Stewardship Plan (Dvornich & Burgess, 2016, p.53).

The BC Mitigation Project is designed to help address the following threats to conservation targets in the Stewardship Plan:

- Habitat conversion and fragmentation due to development, removal of native vegetation, and roads;
- Poor water quality caused by residential use of fertilizers, domestic animal waste, septic tank leakage, spraying of herbicides along public roads, and road runoff;
- Loss of pools, large wood, and riparian vegetation due to development and channelization of the river; and
- Introduction of invasive, exotic, non-native species including plant and wildlife species (Dvornich & Burgess, 2016, p.54).

The BC Mitigation Project is also designed to help addresses the following Stewardship Plan conservation strategies:

- Reduce habitat conversion and fragmentation (due to development and human activity);
- Enhance water quality and quantity; and
- Eliminate invasive and introduced species (Dvornich & Burgess, 2016, p.55).

## **3. Salmon Habitat Protection and Restoration Strategy for Puyallup and Chambers Watersheds**

Puyallup (WRIA 10) and Chambers (WRIA 12) Watersheds Salmon Recovery Lead Entity, staffed by Pierce County Surface Water Management, developed the *Salmon Habitat Protection and Restoration Strategy for Puyallup and Chambers Watersheds* (“Salmon Recovery Strategy”) in 2005 to “provide a scientific framework for identifying priorities and strategies to support protection and restoration of salmon habitat in both watersheds and, ultimately, the Puget Sound region” (WRIA 10/12, 2018, Executive Summary p.1).

The Salmon Recovery Strategy was updated multiple times since its development and was last updated in 2018 to include 50-year habitat goals and 10-year implementation goals (WRIA

10/12, 2018; “2018 Salmon Recovery Strategy”). The 2018 Salmon Recovery Strategy also lists “in-lieu fee”, as administered by King County MRP, as one of the regulatory and protection tools that supports protection of salmon habitat and natural resources (WRIA 10/12, 2018, p.30). Boise Creek is listed as a high-priority tributary and is of high priority for protection and restoration (WRIA 10/12, 2018, p.62-66).

The BC Mitigation Project is designed to help address multiple strategies listed in the 2018 Salmon Recovery Strategy, including the following:

- Protect highly productive tributary and mainstem areas;
- Remove physical barriers to fish movement and migration;
- Restore habitat in highly productive tributaries and mainstem areas;
- Restore and maintain hydrologic regime; and
- Improve water quality (WRIA 10/12, 2018, p.71-72).

Furthermore, the BC Mitigation Project is designed to help address multiple high priority actions specifically listed for Boise Creek in the 2018 Salmon Recovery Strategy:

- Restore floodplain connection and off-channel habitat;
- Restore habitat diversity and complexity;
- Restore riparian function;
- Restore and protect rearing, foraging habitats; and
- Protect and maintain natural geomorphic processes and riparian functions where they exist (WRIA 10/12, 2018, p.65-66).

#### **4. Puyallup-White (WRIA 10) Watershed Restoration and Enhancement Plan**

The *Puyallup-White (WRIA 10) Watershed Restoration and Enhancement Plan (Final Draft)* (Ecology, 2021; “Watershed Plan”) was developed to identify projects to offset impacts from withdrawal of groundwater for domestic wells to streamflows over 20 years and provide a net ecological benefit to the watershed.

The BC Mitigation Project is designed to help address multiple limiting actors affecting the Puyallup/White River Watershed listed in the Watershed Plan:

- Loss of floodplain habitat, wetlands, and connectivity to hyporheic zone;
- Loss of off-channel and side-channel habitat;
- Loss of natural habitat-forming flow regimes;
- Loss of riparian corridors, including marine riparian, and floodplain forests;
- Loss of instream habitat complexity and connectivity;
- Loss of large wood;
- Increase in river channelization;
- Loss of spawning and rearing habitat; and
- Loss of good water quality, including appropriate temperature (Ecology, 2021, p.19).

#### **D. Compensation Planning Framework**

The Compensation Planning Framework in Appendix I, Section 7.0 of the Program Instrument identifies factors that limit habitat in the White/Puyallup River Watershed (King County, 2012). Select limiting factors are listed followed by actions at the BC Mitigation Project site that are expected to address the limiting factor.

- Altered hydrology
  - BC Mitigation Project will allow increased hydrologic connectivity.
  - BC Mitigation Project will allow increased hydraulic complexity over time.
- Increase in river channelization
  - BC Mitigation Project will remove sections of stream armoring that contributes to river channelization.
- Loss of floodplain connectivity and habitat
  - BC Mitigation Project will provide connections to the historic floodplain for flood storage during more frequent flood intervals.
  - Regrading will increase topographic complexity and connectivity to riverine hydrology.
  - Habitat quality will be dramatically higher than the existing degraded upland area.
- Loss of riparian habitat
  - Preserving and enhancing riparian vegetation will promote large wood recruitment, provide cover for habitat and shade, and increase allochthonous inputs.
- Loss of large wood
  - Large wood will be added near the confluence with Beaver Creek and throughout the wetland.
- Loss of instream habitat complexity and connectivity
  - Large wood will be added near the confluence with Beaver Creek.
  - BC Mitigation Project will remove sections of stream armoring.
- Loss of spawning and rearing habitat
  - Regrading will create habitat features such as swales and a backwater.
- Loss of good water quality
  - Planting will provide water filtration and shading.

Appendix I, Section 7.0 of the Program Instrument also referenced goals for mitigation in a watershed context. These goals are listed followed by actions at the BC Mitigation Project site that are expected to contribute to the goal.

- Protect and restores aquatic habitat
  - The BC Mitigation Project will re-establish wetland and instream habitats and create connections to Boise Creek.
- Restore and improve riparian habitat
  - The BC Mitigation Project will preserve, restore, and enhance riparian vegetation and preserve mature vegetation.
- Reduce flood hazards and damage.
  - The BC Mitigation Project is expected to provide small, localized decreases in water surface elevations during high flows.
- Improve water quality

- Planting will provide water filtration and shading, contributing to reduction of stream temperatures.
- Reconnecting the floodplain during more frequent flows will send more water through a stream/wetland complex, which will provide substantial residence time and filtration.
- Recruitment of large wood
  - Large wood will be added near the confluence with Beaver Creek and within the wetland.
  - Preserving, restoring, and enhancing riparian vegetation will promote large wood recruitment.

### ***E. Likelihood of Success***

The BC Mitigation Project site was selected due to its high likelihood of success. The BC Mitigation Project site is located within 1 RM of two successful salmon restoration projects designed and implemented by King County: Evans Channel Restoration Project and Van Wieringen Stream Restoration Project (**Figure 4**). The likelihood of success at the BC Mitigation Project is high because the project will expand upon the successes and lessons learned from existing, nearby salmon restoration and King County mitigation sites:

- Members of the BC Mitigation Project design team were directly involved in design, monitoring, and maintenance of Taylor Creek and Rainbow Bend mitigation projects and bring lessons learned to the current BC Mitigation Project design.
- Water level monitoring before construction will provide baseline data to assess whether water levels change because of beaver dams, allowing the team to better accommodate this natural process.
- Mature vegetation and higher water surface elevation may attract beavers to the site, which will also increase the likelihood of sustained wetland conditions in the BC Mitigation Project site.

### ***F. Nearby Mitigation and Restoration Projects***

King County has implemented three salmon restoration projects on Boise Creek downstream of the BC Mitigation Project and various projects (led by King County and others) in the vicinity are planned or have been completed (King County, 2022b; **Figure 4**). The Lower Boise Creek Channel Restoration Project, completed in 2011, is located downstream from the BC Mitigation Project at the confluence of Boise Creek and the White River just upstream of the SR 410 bridge over the White River. This project was implemented on King County-owned land and restored a degraded channel with limited fish habitat to create two acres of spawning habitat for various salmonid species, doubled the channel length, created two acres of floodplain habitats, and established riparian buffer along both sides of the channel.

The Evans Channel Restoration Project at Middle Boise Creek is located 0.8 RM downstream from the BC Mitigation Project site and was completed in 2013. This project restored an incised and degraded channel by widening and re-recontouring the channel and planting the riparian buffer. The project successfully improved salmonid rearing and refuge habitat in Boise Creek along approximately two acres of King County-owned property.

The Van Wieringen Stream Restoration Project, completed in 2018, is also located at Middle Boise Creek, approximately 1 RM downstream from the BC Mitigation Project. King County

acquired a conservation easement on a private property and implemented this project, which created 1.3 acres of new aquatic and floodplain habitat for salmonids and enhanced associated riparian buffers.

King County completed the 284<sup>th</sup> Avenue SE Culvert Replacement Project in 2023. This fish passage project, located on Beaver Creek upstream from the BC Mitigation Project, remedied a severe partial barrier culvert and provides better access for adult salmon, including coho, steelhead, and pinks, to approximately 1.4 miles of upstream reaches, which provide additional spawning habitat. After the partial barrier removal, there is an expectation that more juveniles would be produced.

The City of Enumclaw, in partnership with the Puyallup Tribe, is sponsoring a restoration project on Boise Creek within the Enumclaw Golf Course, upstream of the BC Mitigation Project site. This project was approved for grant funding in 2022 and will restore a highly modified and degraded portion of Boise Creek within the golf course back to a historic channel (RCO, 2023). The first phase of the project was completed in 2023 and the second phase was completed in 2024.

King County recently purchased a 100-foot-wide permanent conservation easement along the north side of Boise Creek, immediately north of the BC Mitigation Project site. The easement will be planted with native trees and shrubs to enhance the degraded buffer.

### ***G. Non-Credit Generating Perimeter Buffer***

A non-credit generating perimeter buffer (NCGP buffer) is required to protect the functions at the mitigation site from certain adjacent land uses. In some cases, the NCGP buffer may be reduced or eliminated if adjacent land uses will not be detrimental to the mitigation site.

The BC Mitigation Project site configuration maximizes the functions to Boise and Beaver creeks by providing significant frontage on Boise Creek and incorporating the confluence with Beaver Creek into the site. However, placing a standard 100-foot NCGP buffer on the BC Mitigation Project site is not feasible because the site is long and narrow and would leave virtually no creditable area in some areas. Therefore, the BC Mitigation Project will have variable NCGP buffer widths to allow the full potential of the site to be realized while still maintaining assurance that the site will not be negatively affected by activities on properties that surround the BC Mitigation Project site. North of the BC Mitigation Project site, parcel 302007-9018 was recently protected by a 100-foot-wide conservation easement permanently protecting the riparian buffer of Boise Creek for habitat purposes. King County intends to treat weeds and develop a native planting plan for this area through other funding programs.

The BC Mitigation Project site is situated in the Enumclaw APD within rural unincorporated King County and is zoned A-35 for agricultural use. This zoning allows one home per 35 acres or one home per vacant legal lot (King County, 2022a). The site is surrounded by A-35 zoning west of 284<sup>th</sup> Ave SE and RA-5 zoning (rural area for low density residential use) east of 284<sup>th</sup> Ave SE. All surrounding properties have been developed with single-family homes.

King County has strong growth management regulations, particularly in APDs. Policies in the 2016 King County Comprehensive Plan protect the surrounding land from development, which limits the effect of development on the functions at the BC Mitigation Project site.

In addition to strong growth management regulations and policies, King County has an impressive history of land conservation with 190,000 acres of land in King County permanently protected since 1970. King County staff are actively working to permanently protect land surrounding the BC Mitigation Project site for salmon habitat and agriculture.

The BC Mitigation Project site is located on 284<sup>th</sup> Avenue SE and the potential effect of rainfall runoff to the site was evaluated by King County engineers. Results from visual inspection and electronic resources show that runoff from the roadway flows into existing ditches, culverts, and pipes before draining directly into Boise Creek, and not into the wetland areas of the project site.

Furthermore, runoff from the adjacent property to the south reaches a low area south of the shared property line before making its way west into Beaver Creek. Even if this runoff were to drain north, it would reach the riparian upland preservation area within the BC Mitigation Project site's NCGP buffer, which slopes towards Beaver Creek, and not towards the project wetlands.

The BC Mitigation Project design preserves almost all intact native vegetation along Boise Creek. Grading is reduced along Boise Creek to preserve the uplands and maintain shade on Boise Creek. Boise Creek provides a natural limit that protects the site from disturbance. Preserving the vegetated upland areas along Boise Creek provides an added layer of protection to the site and buffers any actions that occur on the unprotected portions on the north side of Boise Creek. However, to gain the most function from the site, connections to Boise Creek are needed, and these connections to Boise Creek should be credited.

To the southwest, much of the site is densely vegetated. Densely vegetated areas are planned to be preserved. Other funding sources may be used to enhanced preserved upland areas with underplanting where appropriate.

The BC Mitigation Project site is unique in its importance to restoration in the watershed, its location in an area of King County with strict development regulations, and its existing, established vegetation that will be preserved along the outer edges of the site. The variable NCGP buffer widths will allow the full potential of the site to be realized while assuring that the site will not be negatively affected by activities on surrounding properties: to the south, east and west, the NCGP buffer is 50 feet wide. These areas have existing native vegetation that would be underplanted where appropriate. To the north, the NCGP buffer is variable in width. There is no NCGP buffer along the north boundary of the western two thirds of the BC Mitigation Project site where parcel 302007-9018 is protected by a 100-foot-wide conservation easement permanently protecting the riparian buffer of Boise Creek for habitat purposes. The NCGP buffer along the north boundary of the eastern one third of the BC Mitigation Project site includes Boise Creek and upland areas within the BC Mitigation Project site. Areas with more upland have an increased buffer width and areas with wetlands closer to Boise Creek have a decreased buffer width. The buffer width would average about 55 feet, including Boise Creek, except where the one high-flow connection and the eastern most direct connections to Boise Creek are made. Connections to Boise Creek would generate credit and are excluded from the NCGP buffer.

## V. Baseline Conditions

The BC Mitigation Project site is located on the on the left (south) bank of Boise Creek in unincorporated King County and is accessed from 248<sup>th</sup> Ave SE. It sits on two parcels, totaling 5.191 acres, which are zoned Agricultural (A-35) by King County. These parcels were previously used as a single-family homesite with agricultural support buildings, pasture, and a forested area with Douglas-fir trees planted in rows. The parcels were acquired by King County in 2020. The single-family residence and associated structures will be demolished or relocated prior to mitigation project construction.

### A. Historic Land Use

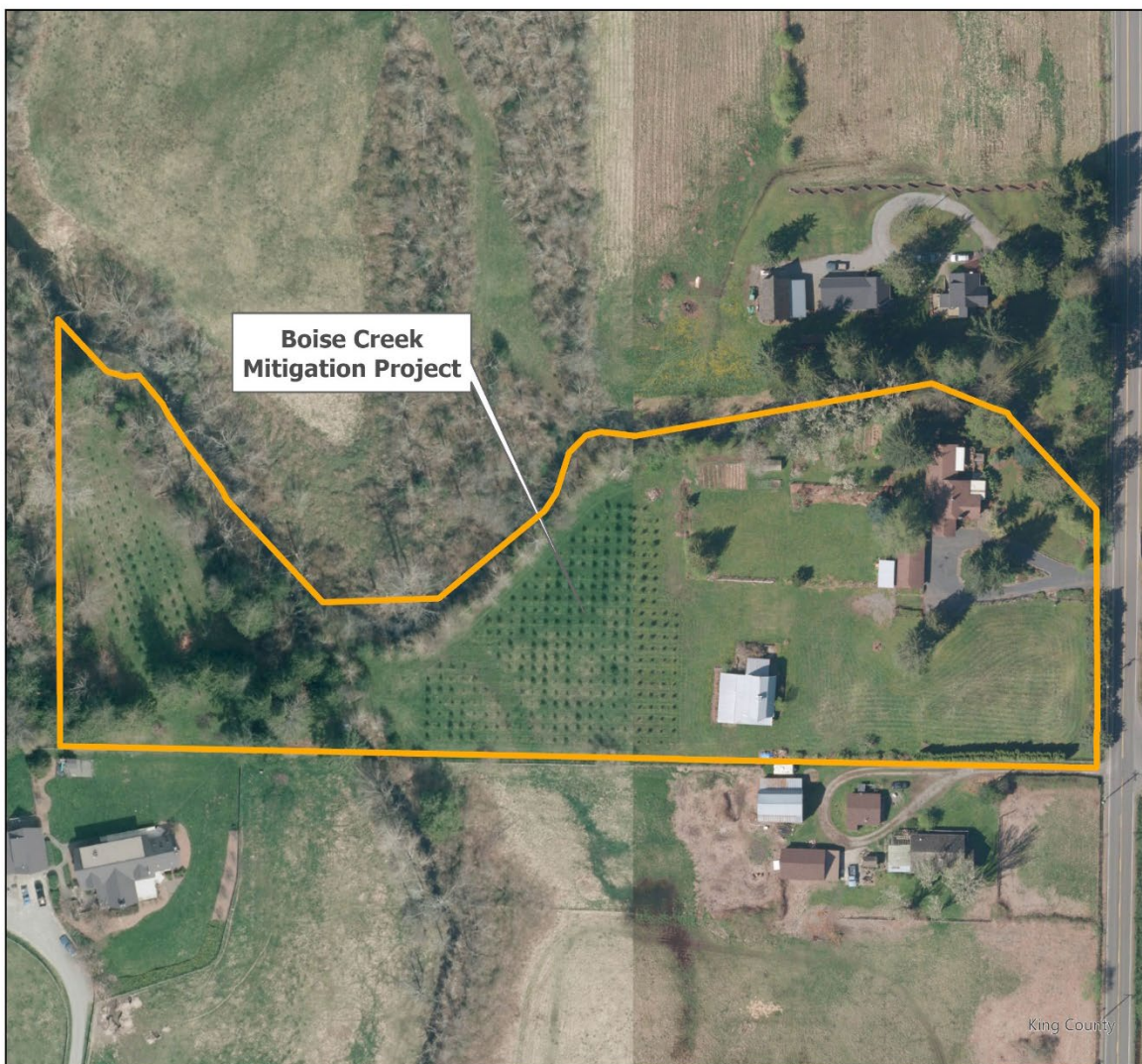
There is limited information about the characteristics of Boise Creek in this reach prior to non-indigenous settlement, but the *Boise Creek RRR* assumed that this part of the Boise Creek basin was predominantly forested pre-development. The BC Mitigation Project site was historically impacted by forest clearing, revetment installation, site grading, conversion to agricultural land use, and development. A Government Land Office (GLO) survey from 1881 shows that the Boise Creek channel was further north from its current location, and both Boise Creek and Beaver Creek have both been straightened over time (U.S. Bureau of Land Management, 1888; **Photo 1**). The 1965 aerial survey (King County, 1965) shows that both streams have been confined to their current channels and the BC Mitigation Project site was mostly cleared and graded for pasture and development (**Photo 2**). Aerial image from 2012 (King County, 2022c) showed the planting of trees in rows in the western part of the BC Mitigation Project site (**Photo 3**).



**Photo 1 Current Location of Boise Creek and the Boise Creek Mitigation Project site on the 1888 Survey (U.S. Bureau of Land Management, 1888).**



**Photo 2 Location of the Boise Creek Mitigation Project site on the 1965 aerial image (King County, 1965).**



**Photo 3 Boise Creek Mitigation Project site on 2012 aerial image (King County, 2022c)**

### ***B. Wetlands***

Wetland investigations performed by King County staff concluded that under baseline conditions, the BC Mitigation Project site parcels do not contain any delineated wetlands or wetland buffers (King County, 2022d; King County, 2023)

### ***C. Streams***

Boise Creek is located between the foothills of the Cascade Mountains and the Puget Sound Lowlands and drains a total area of 15.4 square miles. Elevations range from almost 4,000 feet on Grass Mountain in the Cascade foothills to 620 feet at the confluence with the White River. The basin area at the project site upstream of the confluence with Beaver Creek is 13.57 square miles, or 49.9% of Boise Creek basin area. The average slope through the project reach is approximately 0.4 to 0.5 percent. The bankfull channel width averages 20 to 25 feet, with bank heights ranging from 3 to 8 feet. The channel is generally incised except for occasional gravel splay deposits over the left bank immediately upstream of the confluence with Beaver Creek. The creek channel exhibits low sinuosity as well as a low frequency of instream large wood and

pool-riffle sequences. It has shallow pools formed at the outside of meander bends (associated with bank erosion) and at constrictions formed by sparse large wood or large trees located on both banks. Pool spacing is approximately 200 feet within the project area. The left bank of Boise Creek within and adjacent to the BC Mitigation Project site has a band of mostly mature deciduous trees with interspersed conifers that were planted in coordination with the previous landowner and King County Conservation District. Near the confluence with Beaver Creek, two extensive areas of conifer plantings (4”-8” diameter at breast height) extend south from mixed deciduous and conifer trees.

Beaver Creek is a tributary of Boise Creek that enters Boise Creek from the south at RM 3.1. This tributary drains a total of 1.87 square miles (12% of the total Boise Creek Basin Area). This subbasin is hilly with elevations ranging from about 760 feet to about 1,700 feet at Pinnacle Peak Park. Channel slopes within the BC Mitigation Project site are 0.1 to 0.2 percent. The bankfull channel width averages 15 feet to 20 feet, with bank heights ranging from 5 feet to 7 feet. Like Boise Creek, the Beaver Creek channel exhibits low sinuosity and low frequency of instream large wood and pool-riffle sequences. Both sides of Beaver Creek within the BC Mitigation Project site are lined with a broad corridor of conifers and deciduous trees, however immediately upstream most of the trees and woody vegetation has been removed up to the edge of the creek except for narrow bands of trees, shrubs, Himalayan blackberry (*Rubus armeniacus*) and reed canary grass (*Phalaris arundinacea*). A concrete access bridge crosses Beaver Creek within the BC Mitigation Project site 140 linear feet upstream from the confluence with Boise Creek, which was used by the previous landowner to provide truck and trailer access to the western portion of the site. The bridge deck is composed of precast concrete slabs bearing on precast concrete abutments, perched 9 feet to 10 feet above the incised channel thalweg.

The United States Geological Survey (USGS) operates one streamflow gage on Boise Creek at the mouth (USGS [12099600](#)), Boise Creek at Buckley, which has a period of record from 1978-present. Flood recurrence intervals for Boise Creek, shown in **Table 3**, were computed for the period of record for the USGS gage from 1978 to 2022 using a Log Pearson Type 3 flood frequency analysis based on the methods published in the USGS 17C Bulletin (England, et al., 2019). Flood frequencies flows for the project area were scaled using basin area scaling factors.

**Table 3 Flood recurrence intervals for Boise Creek (USGS 12099600)**

Recurrence Interval (Years)	Peak Discharge at the Mouth (cfs)	Peak Discharge upstream of Beaver Creek confluence (cfs)	Beaver Creek Peak Discharge (cfs)
2	468	324	57
5	727	504	88
10	914	633	111
25	1164	806	141
50	1360	942	165
100	1562	1083	189

#### **D. Uplands**

The upland area of the BC Mitigation Project site is generally divided into two distinct parts: the cleared area in the eastern portion, and the more forested western portion. The eastern portion is dominated by pasture grasses with patches of landscape plants and fruit trees. There are large western red-cedar (*Thuja plicata*), Douglas-fir, and poplar trees (*Populus Sp.*) along the riparian edge of Boise Creek. Portions of the western side of the site were densely planted in rows with Douglas-fir and have very little undergrowth. Further west of the densely planted Douglas-fir trees, there is a mix of open patches of grass and mature forested areas dominated by western red-cedar, Douglas-fir, red alder (*Alnus rubra*), big leaf maple (*Acer macrophyllum*), and a variety of native shrubs and ferns including patches of false lily-of-the-valley (*Maianthemum dilatatum*).

#### **E. Fish**

Boise Creek is designated critical habitat for multiple salmonid species, including spring Chinook (*Oncorhynchus tshawytscha*), fall Chinook, sockeye (*O. nerka*), coho (*O. kisutch*), fall chum (*O.s keta*), and pink salmon (*O. gorbuscha*), as well as steelhead trout (*O. mykiss*) and resident coastal cutthroat trout (*O. clarki ssp.*) (WDFW, 2023). The White River spring Chinook is the only spring Chinook stock in Puget Sound (Puyallup River Watershed Council, 2014). Chinook salmon and Puget Sound steelhead are protected as threatened species, while coho salmon is listed as species of concern under the Endangered Species Act.

#### **F. Wildlife**

A variety of birds typical of western Washington have been observed in the area. American dipper (*Cinclus mexicanus*), American robin (*Turdus migratorius*), house wren (*Troglodytes aedon*), northern flicker (*Colaptes auratus*), common raven (*Corvus corax*), black-capped chickadee (*Poecile atricapillus*), great blue heron (*Ardea herodias*), Stellar's jay (*Cyanocitta stelleri*), belted kingfisher (*Megaceryle alcyon*), dark-eyed junco (*Junco hyemalis*), red-tailed hawk (*Buteo jamaicensis*), and bald eagle (*Haliaeetus leucocephalus*) have all been observed on the BC Mitigation Project site. A bald eagle nest was observed on the western boundary of the BC Mitigation Project site (**Figure 5**). Beaver (*Castor canadensis*) activity has been observed within the site. Elk (*Cervus elaphus*) and deer (*Odocoileus hemionus*) are common in the area, as well as a variety of small mammals and amphibians.

#### **G. Water Quality**

Ecology assigns designated uses for each water body or water body segment. The designated use specifies the water quality standards which apply to the water body (Ecology, 2023). Per Washington Administrative Code (WAC) 173-201A-602, Boise Creek is categorized as “Core Summer Salmonid Habitat” for Aquatic Life Uses, and “Primary Contact Recreation” for Recreational Uses (Washington State Legislature, 2023).

The key identifying characteristics of “Core Summer Salmonid Habitat” include “summer (June 15 - September 15) salmonid spawning or emergence, or adult holding; use as important summer rearing habitat by one or more salmonids; or foraging by adult and subadult native char. Other common characteristic aquatic life uses for waters in this category include spawning outside of the summer season, rearing, and migration by salmonids” (WAC 173-201A-0200). “Primary Contact Recreation” includes activities where an individual would have direct contact with water to the point of complete submergence.

The reach of Boise Creek where the BC Mitigation Project site is located is on Ecology's 303(d) list (Category 5) for not meeting standards for pH and bacteria (fecal coliform). It is also listed as "Waters of Concern" (Category 2) for having evidence of water quality problem associated with temperature and dissolved oxygen, but not enough to require production of a Total Maximum Daily Load (TMDL) (Ecology, 2023).

## **H. Soils**

Natural Resource Conservation Service (NRCS) data identify two soil types within the BC Mitigation Project site: Buckley gravelly silt loam and Alderwood gravelly sandy loam.

The Buckley series is formed from parent material from the Osceola volcanic mudflow. It consists of moderately deep gravelly loams. Below the gravelly loam layers are a dense lahar layer. The lahar layer is very hard and very firm, and it breaks up into a gravelly sandy clay loam. These are poorly drained soils. A lahar is a debris flow or mudflow composed of a slurry of rocky debris, pyroclastic material, and water. Typically, the materials flow from a volcano down along a river valley, in this case from Mt. Rainier.

The Alderwood series consists of moderately deep, moderately well drained soils formed in glacial till. Alderwood soils are on glacially modified foothills and valleys and have slopes of 0 to 65 percent. Both Buckley and Alderwood are geographically associated soils.

## **I. Geomorphology**

Prior to extensive human modifications, Boise Creek was likely a complex network of multiple shallow channels and connected, large wetlands. Outside of alluvial fan areas the channels were likely relatively stable over time with channel change driven by beaver activity and large, infrequent flood events.

Currently, near the BC Mitigation Project site, Boise Creek is confined in a constructed channel excavated in low permeability, erosion resistant lahar deposits. The channel was constructed and maintained through most of the 1900's to accommodate farming, improve agricultural drainage, and convey sediment across the low gradient Enumclaw plateau. As a result, the channel is deeply incised with limited floodplain connection and deficits in large wood and riparian vegetation.

Channel morphology is typically a simple trapezoidal channel with a planar bed, gravel substrate and infrequent forced pools. Channel slope, confinement, and sediment transport capacity all decrease rapidly as the channel transitions from the foothills to the plateau approximately one mile upstream of the BC Mitigation Project site resulting in a zone of significant sediment deposition upstream of the site. At the BC Mitigation Project site, sediment supply and transport capacity appear to be nearly balanced. There is some evidence of net deposition near the confluence with Beaver Creek where there is increased channel and connected floodplain width, but in-channel conditions throughout the project site are generally stable. Downstream, channel slope and confinement gradually decrease causing a drop in sediment transport capacity and locally significant sediment deposition until the stream enters a deeply incised ravine leading down to the White River floodplain.

Channel migration is not evident in recent aerial photos, but banks are locally over-steepened and show evidence of periodic slope failures. Beavers are present and active on the site, but no

beaver dams have been observed at the site by the design team. Given existing hydraulic and geomorphic conditions, beaver could be capable of occupation in the area including bank dens and dams within Boise Creek or Beaver Creek.

## VI. Mitigation Work Plan

### A. Wetland Re-Establishment

#### 1. Grading

The grading plan was derived by determining the depth of excavation required to establish the desired wetland plant communities while considering habitat creation and juvenile salmonids usage through the following processes:

1. First, existing soils at the BC Mitigation Project site were analyzed. Site soils gradation analysis based on test pit data and cultural resources shovel probes indicated the presence of lahar soils across many areas of the BC Mitigation Project site where grading would occur. Pockets of alluvium were encountered closer to Boise Creek in a relatively low-lying area just upstream of the confluence with Beaver Creek. It was determined that the stream data loggers provided more useful data for wetland design due to the influence of lahar deposits on groundwater elevations throughout the site.
2. Another site characteristic that influenced the grading plan was uncertainty related to the permanence of shallow groundwater and surface water flow patterns and quantities from neighboring privately owned parcels. Future action taken by neighbors could potentially redirect or reduce sources of surface flow to the BC Mitigation Project site. The tributary area of surface water flow directed towards the site from the south is also relatively small and limited to a handful of privately owned parcels.
3. Based on the factors described in 1 and 2 and a review of design benchmark elevations successfully used for other wetland projects, wetland design elevations were developed based on Boise Creek hydrology using a combination of 2021-2023 data from water surface elevation (WSE) loggers (**Graph 1**). Specifically, a range of hydrologic benchmarks were developed and reviewed, primarily tied to the wetland plant communities' early growing season (early growing season) for the time period of February 15<sup>th</sup> through May 15<sup>th</sup>. The benchmarks that were compared include:
  - a. The average of all recorded groundwater surface elevations during the early growing season for all years of data collection.
  - b. The median of all recorded early growing season groundwater surface elevations for all years of data collection.
  - c. The minimum stage and flow exceeded with a 60% probability for a 21-day duration during the early growing season for the driest year of data collection.
  - d. The minimum stage and flow exceeded with a 60% probability for a 21-day duration during the early growing season at the site based on a linear regression from the USGS gage period of record (Boise Creek at Buckley Gage [12099600](#) 1978-present).
  - e. The minimum stage and flow exceeded with a 60% probability for a 21-day duration at the site based on the driest year on record based on linear regression from the USGS Boise Creek at Buckley gage (USGS [12099600](#)).
  - f. The historical discharge and stage averages at the site between March 15<sup>th</sup> through June 30<sup>th</sup> (Chinook smolt outmigration season) for all years of data collection as well as the USGS Boise Creek at Buckley gage (USGS [12099600](#)) period of record.

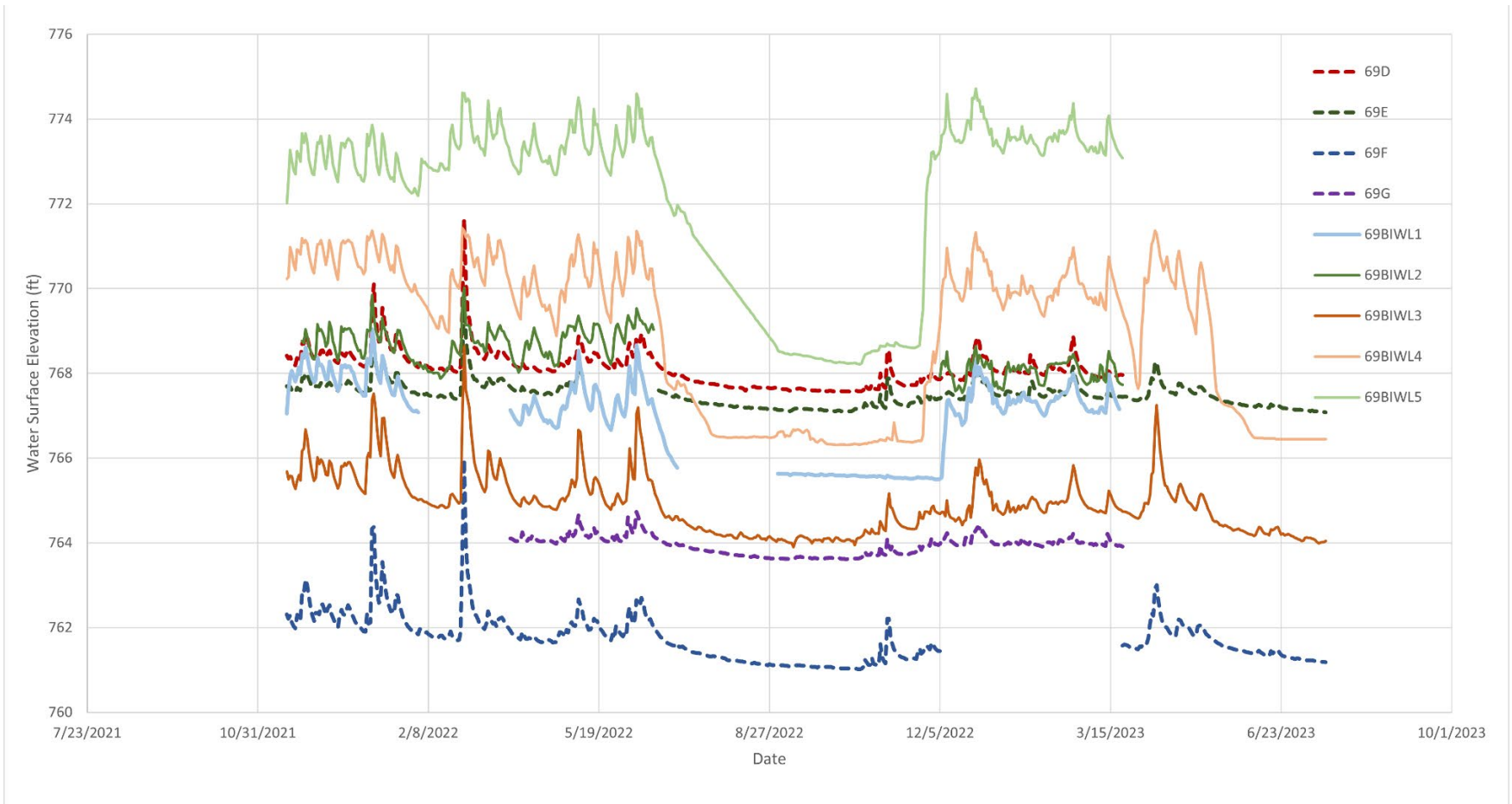
4. Benchmark “d” (the 60% exceedance probability flow and stage relative to the USGS period of record through May) was selected as the most suitable for the site to provide the most reliable basis for the wetland design surface based on the following:
  - a. The 2022 early growing season and Chinook outmigration periods occurred during a wetter than average year (81<sup>st</sup> percentile based on Mud Mountain precipitation data) due to significant high flow events, including the March 1, 2022, flood event which peaked close to a 10-year flood frequency. Therefore, the mean and medians of the site’s data loggers are not representative of an average water year during these periods. 2023 precipitation and data logger were analyzed for comparison.
  - b. The groundwater surface elevations for benchmark “d” provided a more conservative, though reasonable, estimate of wetland design water surface elevations compared to the measured flows for the two years of the period of record (benchmarks “a”, “b”, and “c”) and the driest year on record from USGS gage [12099600](#) (benchmark “e”).
  - c. The longer USGS period of record captures a broader range of conditions and much larger data set, and therefore can be considered more representative.
5. Once the preferred benchmark elevation had been calculated for each monitoring well, a wetland design groundwater surface was extrapolated to encompass the entire project site.
6. The desired wetland community types were then laid out at the project site based on ecological criteria for different wetland cells, historic conditions in the adjacent Boise Creek reach, and design team experience. The best available science and mapping of adjacent existing wetlands was then used to determine the level of saturation required to establish each community type (**Graph 2** and **Graph 3**).
7. The depth of excavation necessary was then determined to establish the appropriate level of saturation for each wetland community type, relative to the groundwater elevation surface. This information allowed the development of a grading plan that would support the targeted wetland communities.

The wetland design on the left bank floodplain of Boise Creek involves the creation of terraced wetland cells that rely on Boise and Beaver creeks as primary sources of wetland hydrology as described above. The grading is designed to provide a range of wetland community types, from emergent to forested, in an area where the existing terrain can accommodate a broader range of elevations with modest excavation. A variety of large wood structures utilizing salvaged trees from the site will be constructed across the wetland area to provide topographic roughness, enhance habitat, and minimize geomorphic risk. The grading concept restores complex floodplain topography to this filled and flattened landscape in a manner that maximizes wetland re-establishment while working with the existing terrain, preserving large trees, and avoiding cultural resources (**Figure 2**).

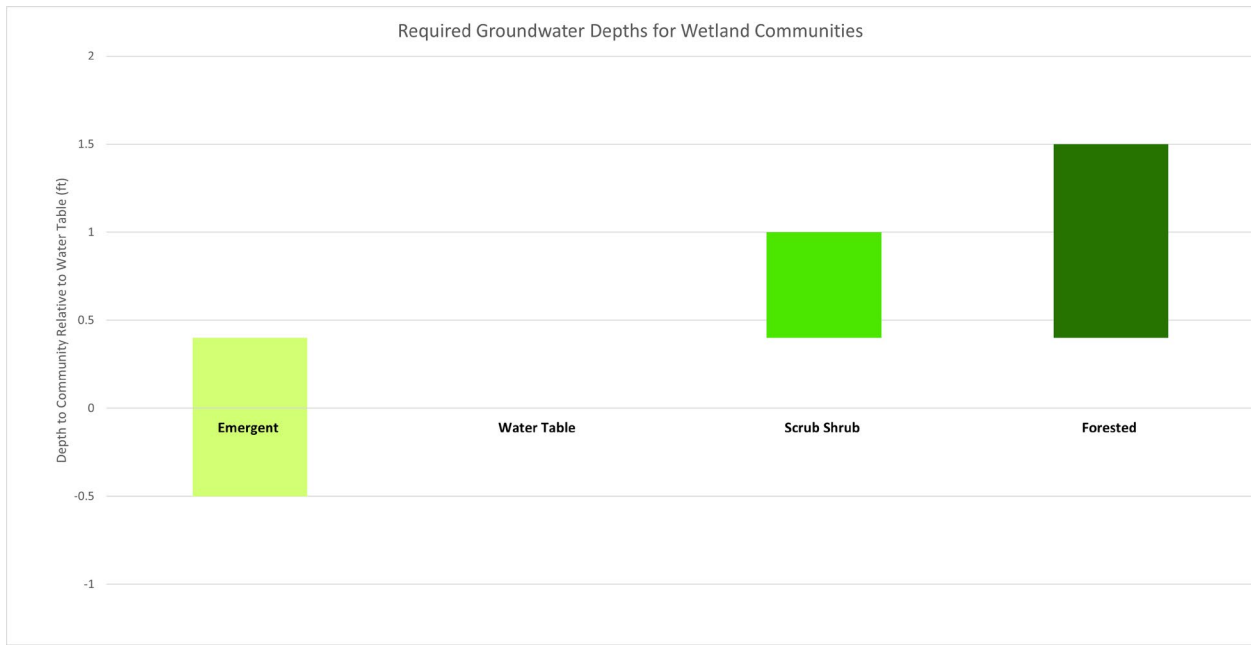
The eastern portion of the project between Beaver Creek and 284<sup>th</sup> includes two wetland cells (upper and lower) and has three connections to Boise Creek (two inlets and one outlet). This area is considered the east wetland. The first inlet includes a structure that will be constructed at the northeast corner of the east wetland to supply flow from Boise Creek to the upper wetland cell. A swale extending from this inlet structure will be excavated along a sinuous flow path through the upper wetland cell before terminating near its southwest corner and discharging into the lower wetland cell. This swale will help distribute creek-supported hydrology throughout the upper wetland cell. Salvaged topsoil will be used to create forested wetland areas, adding topographical diversity adjacent to the swale.

The lower wetland cell, east of Beaver Creek, will receive creek supported hydrology from two sources; excess flow from the upper wetland cell and from a second Boise Creek inlet constructed approximately 200-feet downstream from the first inlet. Excess flow from the upper cell will enter the lower cell at its approximate midpoint. The second inlet provides design redundancy ensuring the lower wetland cell still receives Boise Creek flow if insufficient flow is delivered from upper wetland cell.

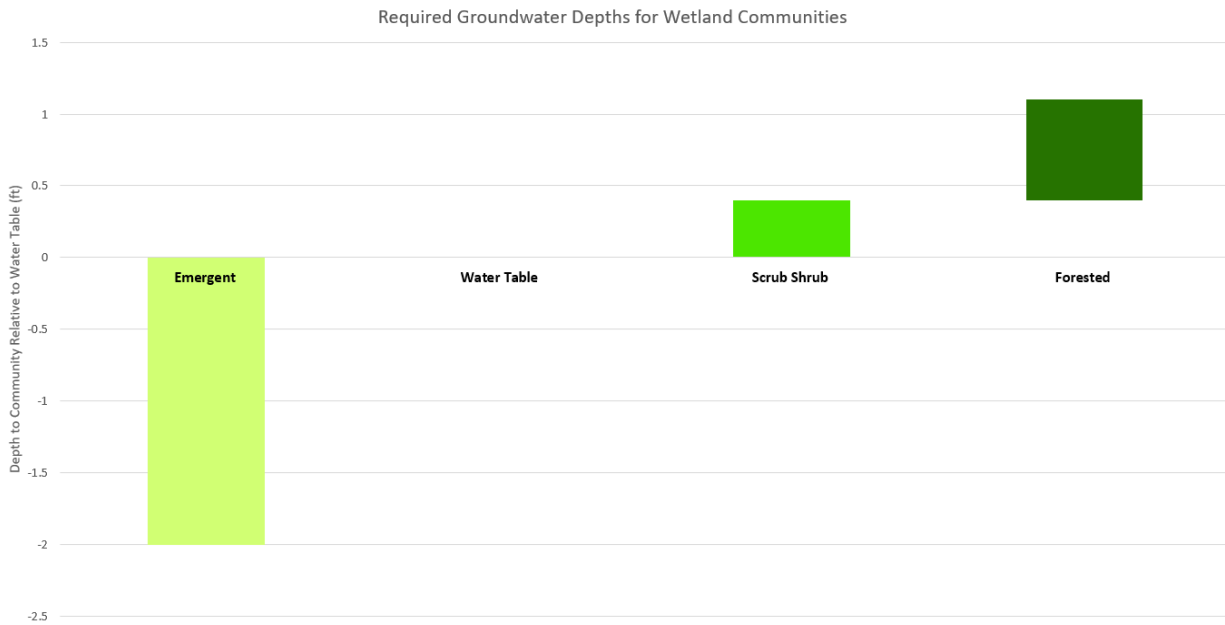
The western portion of the site, west of Beaver Creek is considered the west wetland. An inlet will be graded on the left bank of Beaver Creek to provide wetland hydrology to the west wetland. A swale will be graded through this area distributing creek flow to support emergent, scrub shrub and forested wetland communities. This swale will connect to Beaver Creek at the upstream end and has a permanent backwater connection at the downstream end containing an emergent wetland.



**Graph 1 Early growing season (February 15<sup>th</sup> through May 15<sup>th</sup>) surface and groundwater elevations.**



**Graph 2 Estimated design depths for wetland communities relative to the early growing season water table benchmark at zero for the eastern part of east wetland.**



**Graph 3 Estimated design depths for wetland communities relative to the early growing season water table benchmark at zero for the west wetland and western part of east wetland.**

## 2. Tree Retention

The BC Mitigation Project design is intended to preserve and protect as many large trees as possible without compromising the project design. Tree retention is an intentional design element that may help combat temperature issues within Boise Creek that have contributed to its status as “Waters of Concern” (Category 2) for having evidence of water quality problem associated with temperature and dissolved oxygen (Ecology, 2023). The grading plan for the BC Mitigation Project site preserves large areas of mature trees along the southern riparian buffer of Boise Creek, which is the northern extent of the BC Mitigation Project site. Large trees are also preserved in the forested western portions of the site and the planted Douglas-fir trees in the center of the site. These preserved forested uplands will serve as seed sources, shade for newly formed wetlands, and sources for large wood over time. They will also provide drier escape areas, denning sites, and nesting and roosting opportunities. The conditions of these areas are expected to evolve as natural processes alter the BC Mitigation Project site, such as beaver activity, water impoundment by large woody material, or other natural processes.

## 3. Native Planting

Native plants will be installed to establish species diversity in the three wetland re-establishment habitat types: forested, scrub-shrub, and emergent, as well as in the riparian upland enhancement. Plant species were selected based on nearby reference sites, their wetland indicator status, and design team experience. Observations and monitoring data from successful mitigation sites were used to generate a list of successful wetland species and the correlated groundwater design elevations. Using project designers’ experience at undisturbed reference sites, wetland community types were laid out, refined, and finalized based on historic conditions in the reach and ecological criteria. All plants will be native to the region and appropriate for the expected environmental conditions. To ensure successful plant establishment, soil treatment may include amending the final grade with compost and salvaging suitable topsoil to reach the final grade. As natural wetland processes are enhanced, the BC Mitigation Project is expected to change. Dynamic wetland and floodplain processes will define the characteristics of the site and specific acreages of individual wetland community types will not be required if natural processes cause the communities to shift. Planting quantities by habitat type are shown in **Table 4**. Final plans may include adjusted quantities, size, and/or spacing; and species may be modified according to availability at the time of planting.

**Table 4 Plant List**

Habitat	Species	Common Name	Condition	Proportion by weight		
Emergent Wetland	<i>Carex obnupta</i>	Slough Sedge	Seed	10%		
	<i>Carex stipitata</i>	Sawbeak Sedge	Seed	10%		
	<i>Eleocharis palustris</i>	Creeping Spikerush	Seed	10%		
	<i>Glyceria elata</i>	Tall Mannagrass	Seed	10%		
	<i>Juncus tenuis</i>	Slender Rush	Seed	10%		
	<i>Juncus ensifolius</i>	Dagger Leaved Rush	Seed	10%		
	<i>Sagittaria latifolia</i>	Wapato	Seed	5%		
	<i>Schoenoplectus acutus</i>	Hardstem Bulrush	Seed	15%		
	<i>Scirpus microcarpus</i>	Small-Fruited Bulrush	Seed	15%		
	<i>Sparganium emersum</i>	Simplestem Burreed	Seed	5%		
				<b>Spacing</b>	<b>Quantity</b>	<b>Total</b>
Scrub Shrub Wetland	<i>Salix sitchensis</i>	Sitka Willow	Live stakes	3' o.c.	1750	7,005
	<i>Salix scouleriana</i>	Scouler's Willow	Live stakes	3' o.c.	1750	
	<i>Salix lucida</i>	Pacific Willow	Live stakes	3' o.c.	750	
	<i>Cornus sericea</i>	Red-Osier Dogwood	1 Gallon	4' o.c.	400	
	<i>Crataegus douglasii</i>	Douglas Hawthorne	1 Gallon	10' o.c.	130	
	<i>Fraxinus latifolia</i>	Oregon Ash	1 Gallon	10' o.c.	120	
	<i>Lonicera involucrata</i>	Black Twinberry	1 Gallon	4' o.c.	375	
	<i>Malus fusca</i>	Western Crabapple	1 Gallon	10' o.c.	130	
	<i>Physocarpus capitatus</i>	Pacific Ninebark	1 Gallon	4' o.c.	400	
	<i>Rosa gymnocarpa</i>	Baldhip Rose	1 Gallon	4' o.c.	300	
	<i>Rosa nutkana</i>	Nootka Rose	1 Gallon	4' o.c.	300	
	<i>Rosa pisocarpa</i>	Swamp Rose	1 Gallon	4' o.c.	300	
	<i>Rubus spectabilis</i>	Salmonberry	1 Gallon	4' o.c.	300	
Forested Wetland	<i>Populus balsamifera</i>	Black Cottonwood	Live stakes	4' o.c.	1500	4,580
	<i>Salix lucida</i>	Pacific Willow	Live stakes	4' o.c.	1250	
	<i>Salix sitchensis</i>	Sitka Willow	Live stakes	4' o.c.	500	
	<i>Alnus rubra</i>	Red Alder	1 Gallon	8' o.c.	250	
	<i>Crataegus douglasii</i>	Douglas Hawthorne	1 Gallon	8' o.c.	120	
	<i>Fraxinus latifolia</i>	Oregon Ash	1 Gallon	8' o.c.	200	
	<i>Malus fusca</i>	Western Crabapple	1 Gallon	8' o.c.	120	
	<i>Rhamnus pershiana</i>	Cascara	1 Gallon	8' o.c.	120	
	<i>Picea sitchensis</i>	Sitka Spruce	1 Gallon	10' o.c.	270	
<i>Thuja plicata</i>	Western Red Cedar	1 Gallon	10' o.c.	250		
Riparian Upland Enhancement	<i>Acer macrophyllum</i>	Big Leaf Maple	1 Gallon	10' o.c.	50	1,210
	<i>Alnus rubra</i>	Red Alder	1 Gallon	10' o.c.	35	
	<i>Amelanchier alnifolia</i>	Western Serviceberry	1 Gallon	5' o.c.	50	
	<i>Abies grandis</i>	Grand Fir	1 Gallon	12' o.c.	50	
	<i>Corylus cornuta californica</i>	Beaked Hazelnut	1 Gallon	10' o.c.	50	
	<i>Oemlaria cerasiformis</i>	Indian plum	1 Gallon	5' o.c.	100	
	<i>Prunus emarginata</i>	Bitter Cherry	1 Gallon	10' o.c.	25	
	<i>Pseudotsuga menziesii</i>	Douglas Fir	1 Gallon	12' o.c.	50	
	<i>Rhamnus pershiana</i>	Cascara	1 Gallon	10' o.c.	50	
	<i>Rosa gymnocarpa</i>	Baldhip Rose	1 Gallon	5' o.c.	100	
	<i>Rosa nutkana</i>	Nootka Rose	1 Gallon	5' o.c.	100	
	<i>Rubus parviflorus</i>	Thimbleberry	1 Gallon	5' o.c.	200	
	<i>Rubus spectabilis</i>	Salmonberry	1 Gallon	5' o.c.	100	
	<i>Symphoricarpos albus</i>	Snowberry	1 Gallon	5' o.c.	200	
	<i>Thuja plicata</i>	Western Red Cedar	1 Gallon	12' o.c.	25	
<i>Tsuga heterophylla</i>	Western Hemlock	1 Gallon	12' o.c.	25		
<b>Total Woody Plants</b>					<b>12,795</b>	

#### 4. Snags, Slash Piles, and Habitat Structures

Other funding sources will be used to place standing snags, slash piles, and habitat structures in the re-established wetland to provide valuable wildlife habitat (**Figure 2**; See **Section VII** for details). Pilings used to stabilize large wood structures may also function as snags.

#### 5. Large Wood Structures

Large wood in the form of individual logs and natural log jams are a pervasive element of pristine floodplains in the Pacific Northwest. In natural settings, these jams provide hydraulic roughness, serve as grade controls to stabilize channels, help to meter flow through side channels, and create complex aquatic, riparian, and terrestrial habitat. In addition to providing cover and habitat for fish, large wood is also important for production of macroinvertebrates and terrestrial wildlife. Large wood provides hydraulic complexity and slow water habitat for rearing salmonids. A broad range of wood sizes will be incorporated into the wetland to mimic natural wood accumulations which vary widely in size and shape, ranging from small sticks and branches to complete tree trunks with rootwads. Interstitial spaces created from the variety of sizes will provide cover and habitat that is not typically present with more uniform assemblages. Large wood will also be strategically used to promote the formation and persistence of scour pools, provide hydraulic roughness and energy dissipation during high flows, and mitigate the risk of avulsion. Most of the logs used in the large wood structures will be sourced from trees salvaged during clearing of the BC Mitigation Project site. The quantity and size classes of large wood in the BC Mitigation Project are shown in **Table 5**. Additional large wood funded by others will be installed within the site and the details are in **Section VII**.

**Table 5 Large Wood Quantities**

<b>Large Wood Size and Quantities</b>	
<i>Large Wood Sizes</i>	<i>Quantity</i>
8"-10" DBH Log with Rootwad	6
12"-14" DBH Log with Rootwad	1
16"-18" DBH Log with Rootwad	2
20"-24" DBH Log with Rootwad	4
28"-36" DBH Log with Rootwad	8
48"-56" DBH Log with Rootwad	1
10" DBH Log without Rootwad	19
16"-18" DBH Log with Rootwad	6
20"-24" DBH Log with Rootwad	4
<b>Total Large Wood</b>	<b>51</b>

Though care was taken to align the clearing and grading limits to preserve as many existing mature trees and vegetation as possible, trees within the grading limits were necessarily felled. However, all felled trees and cleared woody material were salvaged for reuse within the project. The trees were felled and stockpiled during site clearing in summer 2024 and will be installed whole and intact to the extent feasible including rootwads, tops, and branches. Branches and tops removed during felling and transport will be salvaged and reused as slash. No woody materials are expected to be exported from the site.

Large Wood Structures will be placed within the BC Mitigation Project site to meter flow into a side channel and provide structure, grade controls, and hydraulic complexity in areas where deeper, higher velocity flows would exist during high flow events (**Figure 2**). Larger diameter conifer salvage trees with branches and rootwads intact removed during site clearing and grading will be supplemented with imported logs. In general, large wood structures will be constructed with four or more trees with DBH of 10-inches or greater. Smaller limbs and brush will be added to the jams as slash to reduce porosity and increase hydraulic roughness and complexity. Logs lashed to existing trees with natural-fiber rope, lashed to buried or driven wooden piles, or positioned with tips on high topographic features will be used either individually or in concert to stabilize the constructed large wood structures. Scour and deposition patterns under and around jams is expected to increase floodplain complexity. Eddies and backwater areas created by these jams will provide flood refuge for fish.

### *Inlet Structures*

Two inlet structures will allow flow from Boise Creek to enter the east wetland of the BC Mitigation Project site and one inlet structure will allow flow from Beaver Creek to enter the west wetland of the BC Mitigation Project site. At the upstream end of the east wetland, a porous channel inlet structure, constructed from several logs with rootwads and backfilled with boulders, cobble, loose wood pieces, and coarse gravel, will span the excavated inlet between the Boise Creek channel and the upper wetland cell. Key structural logs will be secured to boulders and wood piles for stability. The elevation of the top of the structure matches the 1.5 to 2-year flow frequency to allow high flows to inundate the site and provide slow water flood refuge.

Approximately 200-feet downstream of the first inlet and near the center of the site, another inlet structure will be constructed of logs and rootwads along the right and left banks of a second inlet into the lower wetland cell in the east wetland. This structure will not span the inlet opening, but instead will have a gap at its midpoint. The key structural logs will be anchored by boulders, shallow buried piles, and/or tied by manila rope to existing standing trees.

The west wetland inlet structure is located in the left bank of Beaver Creek near its confluence with Boise Creek. This inlet will include two logs with rootwads on the right bank of the new channel and one log with rootwad on the left bank of the new channel. Key structural logs will be secured to boulders and wood piles for stability.

These inlet structures allow flow to be sourced from Boise and Beaver creeks without resulting in adverse impacts to summer low flows in the main channel, provide slow velocity flood refuge, and limit the risk of avulsion.

### *Deflector Structure*

Within the BC Mitigation Project site, a deflector structure will split flows entering the site during higher flow events. This structure will slow velocities and allow water to spread out

across the east wetland. This structure is composed of three logs with rootwads that will be anchored by shallow buried piles and manila rope.

### ***Outlet Structure***

An outlet structure located at the end of the side channel downstream of the Beaver Creek / Boise Creek confluence will help stabilize both banks of the side channel by dissipating energy produced at higher flows. Large logs with rootwads will be aligned parallel to the bank on each side of the outlet, with their rootwads facing Boise Creek. An additional log with rootwad will be placed on top and perpendicular to each of these logs with rootwads facing the inlet. The outlet structure will be anchored with shallow buried piles and tied with manila rope to standing existing trees.

## **6. Beaver**

Beaver activity is anticipated at the BC Mitigation Project site and various design elements were analyzed during alternatives analysis with beaver activity in mind. Design elements with larger inlets and flow through channels were thought to split too much flow and thereby encourage additional beaver activity in the mainstem of Boise Creek and encourage more active damming in the wetland areas. Design measures were implemented to reduce the likelihood of beavers building sustainable dams within the mainstem of Boise Creek.

Flow regulation will be implemented through an inlet structure to meter flow into the wetland area while keeping the primary flow in the mainstem of Boise Creek. By keeping the primary flow in the mainstem of Boise Creek within the upstream end of the site, the design will continue to discourage dam building in problematic portions of Boise Creek.

The wetlands are designed to be fed by smaller metered inlets and are designed to spread flow over a large area rather than having smaller persistent channels with pinch points that may be attractive for dam building by beavers. The outlets to the wetland areas are larger and sloped gradually as to not provide attractive pinch points that beavers favor in dam building.

Beaver resistant plantings were considered but the species are very limited and too slow growing to provide adequate shade required to keep water temperatures cool. Fencing was also considered but given the number of inlets and outlets and the complexity the fencing design would require, it was ruled out as an initial design element.

### ***B. Potential Geomorphic Response to BC Mitigation Project***

The BC Mitigation Project is intended to provide off-channel wetland and aquatic rearing habitat while avoiding significant changes to main-channel geomorphic conditions. To achieve these goals, the BC Mitigation Project is designed to provide frequent and long-duration connections between Boise Creek and the constructed wetlands, while limiting the hydraulic conveyance in the wetland area. Grading, large wood structures, and plantings in and around floodplain inlets and other hydraulic control points have been designed to provide surface water connection at or near the full range of anticipated flows, while limiting changes to main channel flow to less than about 20% of the pre-project discharge for the 2- and 10-year recurrence interval flows. By limiting increases in floodplain conveyance and avoiding significant changes in main channel geometry and roughness, changes in velocity, shear stress, and geomorphic change throughout the BC Mitigation Project area will be limited.

Geomorphic change was considered for various zones of the BC Mitigation Project based on hydraulic changes. Anticipated geomorphic effects on each zone were developed using the 2-D hydraulic model results and the engineering plans, and these are addressed in the *Boise Creek Mitigation Project – Hydraulic Analysis and Geomorphic Assessment Report* (King County, 2024a). As designed, the BC Mitigation Project does not pose significant new flood hazards or geomorphic risks relative to existing conditions. As-built flow redistribution is likely to sustain wetlands without causing impacts from erosion or sedimentation. Beaver activity in the main channel will remain a risk following project completion, but anticipated geomorphic change is not likely to have a major effect on beaver behavior. Revegetation may have a greater effect. Maintenance of the project will include an evaluation of beaver activity and inspection of inlet control systems consisting of large wood, vegetation, and coarsened substrate (**Section XI**). Adaptive management may be required if the inlet structures do not perform as modeled and result in impacts to constructed wetlands or undesirable changes in the main channel (**Section XIII**).

### **C. Signage/Access**

At the completion of project construction, King County will install signs that identify the BC Mitigation Project site as a sensitive area. Additional signs may be installed by King County identifying it as a Natural Area. A small area along 284<sup>th</sup> Ave SE will be reserved for safe parking for staff and contractors conducting maintenance and monitoring. This area will be secured to prevent unauthorized use.

## **VII. Additional Habitat Features Funded by Others**

Various habitat features funded by others will be installed within BC Mitigation Project site to provide additional ecological benefits to the site. These features will not generate credit and have been excluded from consideration related to credit calculations.

### **A. Floodplain Bench**

Grading at the confluence of Beaver and Boise creeks will provide a floodplain bench for installation of a large wood structure anchored to boulders and existing trees to provide more room for the creeks to occupy during high flows (**Figure 2**). Native trees and shrubs, such as black cottonwood, willow, and red-osier dogwood will be planted at the floodplain bench. The acreage associated with the floodplain bench is excluded from credit calculations.

### **B. Snags and Slash Piles**

Standing snags and slash piles will be placed in the re-established wetland to provide valuable wildlife habitat (**Figure 2**). Snags will emulate dead trees and provide valuable nesting and foraging habitat.

### **C. Habitat Structures**

Large wood funded by others will include large wood clusters, brush piles and loose wood pieces placed in various areas of the wetland to provide terrestrial and aquatic habitat. These habitat structures will be constructed to emulate debris jams that form naturally when large wood carried by flood waters accumulates on taller, stable floodplain features like standing trees, brush, or topographic highs. Habitat structures will typically be composed of two large logs with rootwads and five smaller logs with rootwads placed within the finished wetland specifically for habitat

enhancement (**Figure 2**). Such intentionally downed trees provide shade, cover, and habitat complexity potentially supporting multiple habitat niches. Habitat structures will continue to provide valuable habitat as they decay, becoming nurse logs that offer tree and shrub seedlings shade, nutrients, water, and facilitate the succession of plants and plant communities. Some of the logs placed for habitat enhancement may be stabilized to resist movement during floods, using natural topography or existing trees, while others will not be stabilized to allow their mobility during flood events. Logs used for habitat structures will likely be 12” to 24” DBH with a few larger logs placed near the side channel egress and laced between existing trees near the confluence of Beaver and Boise creeks.

#### **D. Native Underplanting**

Native tree and shrub species, such as grand fir, big leaf maple, Indian plum, and snowberry, will be planted in the riparian upland preservation area (**Figure 2**).

### **VIII. Determination of Mitigation Credits**

Mitigation credit was determined at the BC Mitigation Project using the Ecology’s *Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Western Washington* (Hruby, 2012; “Credit/Debit Method”).

#### **A. Wetland Credits**

Wetland re-establishment areas will be used to calculate wetland credit potential of the BC Mitigation Project using the Credit/Debit Method.

Wetland credits will be available to offset direct and indirect wetland impacts that were permitted using the Credit/Debit Method. Temporal loss factors are incorporated into the Credit/Debit Method calculations during impact project permitting.

The Credit/Debit Method combines a functional assessment (using rating scores) with area to calculate credits for water quality, hydrologic, and habitat ecosystem function groups. Existing wetlands are rated before mitigation project implementation and post-project to determine the lift available due to enhancement or rehabilitation activities. Lift is determined by subtracting post-project ratings from pre-project ratings. Uplands that will be converted to wetlands by re-establishment or creation, are given pre-project ratings in all three functional categories of 0. The post-project scores rate the entire wetland unit.

The Credit/Debit Method uses a rapid approach to analyze and assign scores for wetland functions. Many questions in the Credit/Debit method are binary. For example, the wetland receives overbank flow, or it does not receive overbank flow; or the wetland is larger relative to the river, or it is smaller relative to the river. These questions tend to lump the functions and fail to credit the functional lift associated with specific actions that enhance, rehabilitate, or add watershed specific ecological value to a wetland.

Since the BC Mitigation Project site does not contain any pre-project wetlands, only post-project wetland scores are shown. The re-established wetland on the BC Mitigation Project site is comprised of two wetland units. The west wetland is 0.252 acre and the east wetland is 2.357 acres. **Table 6** presents the overall ranking of High, Medium, or Low for the west post-project wetland. **Table 7** presents the overall ranking of High, Medium, or Low for the east post-project

wetland. The wetland scoring form and Credit/Debit worksheets can be found in **Attachment 2**. **Table 8** presents the anticipated mitigation credits resulting from the BC Mitigation Project.

**Table 6 West Wetland Post-Project Scores**

	<b>Water Quality</b>	<b>Hydrologic</b>	<b>Habitat</b>
Site Potential	H	M	H
Landscape Potential	H	H	M
Value	H	H	H
<b>Score Based on Ratings</b>	<b>9</b>	<b>8</b>	<b>8</b>

**Table 7 East Wetland Post-Project Scores**

	<b>Water Quality</b>	<b>Hydrologic</b>	<b>Habitat</b>
Site Potential	H	H	H
Landscape Potential	H	H	M
Value	H	H	H
<b>Score Based on Ratings</b>	<b>9</b>	<b>9</b>	<b>8</b>

**Table 8 BC Mitigation Project Credits**

<b>Restoration Type</b>	<b>Acreage</b>	<b>Credit/Debit Credits</b>
Wetland Re-establishment (East)	2.357	61.282
Wetland Re-establishment (West)	0.252	6.300
<b>TOTAL</b>	<b>2.609</b>	<b>67.582</b>

### **1. Temporal Loss Factor**

The Credit/Debit Method requires application of a temporal loss factor on debit calculations, based on the type of wetland impacted (emergent, forested, etc.) and the anticipated timing of mitigation project implementation. For impact projects utilizing the KC MRP, the standard temporal loss factor is “delayed”, which requires a factor that ranges from 3 to 7, depending on the characteristics of the impacted wetland (Hruby, 2012).

### **2. Risk Factor**

The State-Wide Policy IRT for In-Lieu Fee Programs determined that a 1.0 Risk Factor should be used to calculate ILF mitigation site credits when using Ecology’s Credit/Debit Tool (Hruby, 2012), provided that the mitigation site satisfies the site selection criteria specified in the Credit/Debit Tool. The Risk Factor is intended to moderate the risk that a mitigation site will fail or will fail to generate as many credits as proposed by the Credit/Debit Tool. No credits are released until the mitigation site meets its performance standards which demonstrate the site’s success. In addition, the mitigation site’s risk is managed through the King County Mitigation Reserves ILF Program itself and how it is set up. With their collective expertise, the King County ILF’s IRT thoroughly evaluates each mitigation project’s site selection criteria, the project’s design, and other related information.

A 1.0 risk factor is appropriate because of the following factors:

- The BC Mitigation Project meets the site selection guidance criteria in *Selecting Wetland Mitigation Sites Using a Watershed Approach* (Hruby, Harper, & Stanley, 2009). See **Attachment 3**.
- Risk is managed through the ILF Program itself in the following ways:
  - No credits are released until performance standards are successfully met;
  - The BC Mitigation Project plans underwent extensive review by the IRT;
  - The IRT and King County staff designing and implementing ILF Program projects have extensive collective knowledge about factors that make a mitigation project successful; and
  - Contingency funds are collected and may be used to ensure project success.

## IX. Performance Standards

These standards document project performance and provide a practical way to manage the project site over the establishment phase.

### Goal 1. Establish and protect wetland and aquatic functions at the Boise Creek Mitigation Project site.

#### Objective 1.1. Permanently protect riparian, wetland, and aquatic ecosystem functions through recordation of permanent legal site protections.

Performance Standards for Administrative Functions	Documentation
1.1.1. Complete development of an approved mitigation plan.	Mitigation plan has been approved by the IRT and amended to the Instrument.
1.1.2. Protect ecosystem functions on the site by placing IRT-approved legal restrictions on parcels 302007-9034 and 302007-9079.	Provide IRT with a copy of the recorded legal restrictions.
1.1.3. Obtain all required environmental documentation, permits, and other authorizations needed to establish and maintain the mitigation site.	Copies of authorizations.

#### Objective 1.2. Build project elements according to IRT-approved plans

Performance Standards for Construction	Documentation
1.2.1. Grading, earthwork complete, and 5 large wood structures are installed according to the approved plans.	As-built drawing submitted to IRT for approval.
1.2.2. Planting of site completed according to the approved plans.	As-built planting plan submitted to IRT for approval.

### Goal 2. Establish riverine wetland and aquatic resources within the Boise Creek Mitigation Project site.

#### Objective 2.1. Re-establish riverine wetland and aquatic habitats.

Performance Standards for Wetlands Areas	Documentation
2.1.1. A minimum of 2.47 acres of the BC Mitigation Project site, will have wetland hydrology present at Year 3.	Monitoring report will document wetland hydrology under normal or wetter than normal hydrologic conditions, according to the <i>Corps of Engineers Wetland Delineation Manual</i> (USACE, 1987) and the <i>Regional Supplement: Western Mountains, Valleys, and Coast Region (Version 2.0)</i> (USACE, 2010, or as revised).

<p><b>2.1.2.</b> By Year 10, re-establish a minimum of 2.47 acres of wetland or dynamic floodplain features<sup>1</sup> in the BC Mitigation Project site. To accommodate natural stream and wetland processes, wetlands, and dynamic floodplain features both count toward the 2.47-acre target. There will be a minimum of 1.65 acres of wetland present in the BC Mitigation Project site.</p>	<p>In Years 5 and 10, monitoring reports will document the combined wetlands and floodplain features within the BC Mitigation Project site.</p> <p>Wetland Areas: Delineate wetland boundaries according to <i>Corps of Engineers Wetland Delineation Manual</i> (USACE, 1987) and the <i>Regional Supplement: Western Mountains, Valleys, and Coast Region (Version 2.0)</i> (USACE, 2010, or as revised), and in Year 10, rate using <i>Washington State Wetland Rating System for Western Washington</i> (Hruby &amp; Yahnke, 2023, or as revised).</p> <p>Floodplain features: In order to count the “floodplain features” towards the 2.47 acres, the ordinary high water mark (OHWM) of all streams/backwaters must be delineated and mapped according to methodology approved by Washington State Department of Ecology and U.S. Army Corps of Engineers. Depositional areas as a result of flooding may also be included as floodplain features.</p>
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**Objective 2.2. Establish native vegetation in wetland areas.**

<b>Performance Standards for Vegetation in Wetland Areas</b>	<b>Documentation</b>
<p><b>2.2.1.</b> At Year 1, the average density of planted native shrubs and trees in re-established forested/scrub shrub wetland habitats will exceed 1,742 per acre (4/100 ft<sup>2</sup> or 5 feet o.c.).</p>	<p>Monitoring reports documenting planted native shrub and tree density in re-established forested/scrub shrub wetland areas in Year 1.</p>
<p><b>2.2.2.</b> Aerial cover of native shrubs and trees in re-established forested/scrub shrub wetland habitats will be a minimum of 15% at Year 3, 30% at Year 5, 50% at Year 7, and 70% at Year 10. Volunteers of desirable native tree and shrub species taller than one foot can count towards achieving the aerial cover percentages.</p>	<p>Monitoring reports documenting native tree and shrub aerial cover in re-established forest/scrub shrub wetland areas. Aerial cover will be measured in Years 3, 5, 7, and 10.</p>
<p><b>2.2.3.</b> Aerial cover of native emergent species in re-established emergent wetland habitats will be a minimum of 15% at Year 3, 30% at Year 5, 50% at Year 7, and 70% at Year 10.</p>	<p>Monitoring reports documenting native emergent aerial cover in re-established emergent wetland areas. Aerial cover will be measured in Years 3, 5, 7, and 10.</p>

<sup>1</sup> **Floodplain features:** Re-established wetlands altered by riverine processes and may include channels, permanently or seasonally disconnected side channels, abandoned channels, isolated or altered backwaters and pools, and depositional areas such as sand/ gravel bars and shelves, and other accumulations as a result of flooding.

**Objective 2.3. Enhance and restore upland areas with native vegetation at the Boise Creek Mitigation Project Site.**

<b>Performance Standards for Vegetation in Riparian Upland Enhancement.</b>	<b>Documentation</b>
<p><b>2.3.1.</b> At Year 1, the average density of planted native shrubs and trees in Riparian Upland Enhancement habitat will exceed 889 per acre (4/100 ft<sup>2</sup> or 7 feet o.c.). Native trees and shrubs existing before construction cannot count towards satisfying this density.</p>	<p>Monitoring reports documenting planted native shrub and tree density in Riparian Upland Enhancement areas in Year 1.</p>
<p><b>2.3.2.</b> Aerial cover of native shrubs and trees in Riparian Upland Enhancement habitat will be a minimum of 15% at Year 3, 25% at Year 5, 30% at Year 7, and 50% at Year 10. Volunteers of desirable native tree and shrub species taller than one foot can count towards achieving the aerial cover percentages.</p>	<p>Monitoring reports documenting native tree and shrub aerial cover in Riparian Upland Enhancement areas. Aerial cover will be measured in Years 3, 5, 7, and 10.</p>

**Objective 2.4. Maintain the entire Boise Creek Mitigation Project site so that the site is dominated by native vegetation through management of non-native and noxious weeds.**

<b>Performance Standards for Non-native and Noxious Weeds on the Entire Boise Creek Site</b>	<b>Documentation</b>
<p><b>2.4.1.</b> In Years 1, 3, 5, 7, and 10, King County-listed Class A weeds will be absent from the BC Mitigation Project site as well as purple loosestrife (<i>Lythrum salicaria</i>), non-native knotweeds [including but not limited to: Japanese knotweed (<i>Polygonum cuspidatum</i>), giant knotweed (<i>P. sachalinense</i>), Himalayan knotweed (<i>P. polystachyum</i>), Bohemian knotweed (<i>P. x bohemicum</i>) and related hybrids]. If present, these weeds will be eradicated<sup>2</sup>.</p>	<p>Monitoring report documenting the presence of and maintenance actions on the entire BC Mitigation Project site for any Class A weeds, purple loosestrife, and non-native knotweed (i.e., zero-tolerance species) at Years 1, 3, 5, 7, and 10. Qualitative monitoring will be used in Year 1.</p>

<sup>2</sup> Eradicate means to eliminate a noxious weed within an area of infestation (WAC 16-750-003 (2)(c)).

<p><b>2.4.2.</b> In the BC Mitigation Project site, the combined aerial cover of the following invasive plant species will be a maximum of 10% in wetland areas and 20% in upland areas at Years 3, 5, 7, and 10:</p> <ul style="list-style-type: none"> <li>• non-native blackberries (<i>Rubus armeniacus</i> and <i>R. laciniatus</i>),</li> <li>• Scotch broom (<i>Cytisus scoparius</i>)</li> <li>• thistles (<i>Cirsium arvense</i>, <i>C. vulgare</i>, <i>Carduus nutans</i>, and <i>Onopordum acanthium</i>),</li> <li>• yellow-flag iris (<i>Iris pseudacorus</i>),</li> <li>• English and Atlantic ivy (<i>Hedera helix</i> and <i>H. hibernica</i>),</li> <li>• English holly (<i>Ilex aquifolium</i>)</li> <li>• butterfly bush (<i>Buddleia davidii</i>),</li> <li>• field bindweed (<i>Convolvulus arvensis</i>)</li> <li>• large bindweed (<i>Convolvulus sylvatica</i>),</li> <li>• black/climbing/ivy bindweed (<i>Fallopia convolvulus</i>)</li> <li>• morning glory/hedge bindweed (<i>Convolvulus sepium</i>),</li> <li>• common reed (<i>Phragmites australis</i>),</li> <li>• Any other Class B or Class C weeds designated for control by King County</li> </ul>	<p>Monitoring reports documenting non-native invasive species cover and maintenance actions on the entire BC Mitigation Project site. Document percent cover of listed invasive species at Years 3, 5, 7, and 10. Document the percent cover of invasive species in the wetland and upland habitat.</p> <p>Qualitative monitoring will be used in Year 1 for the entire BC Mitigation Project site.</p>
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## X. Monitoring Methods

Mitigation monitoring will be documented in a monitoring report in Years 1, 3, 5, 7, and 10 after construction. Reports will be submitted to the IRT by April following the monitoring activities unless the IRT approves an extension. The monitoring methods may be revised with IRT approval to improve consistency and accuracy. If the monitoring methodologies as written below do not accurately characterize the success of a particular habitat area, King County will coordinate with the Corps and Ecology about changing the monitoring approach, which performance standards to apply in those areas, or how existing performance standards could be modified. Experience in the field may indicate that other performance monitoring methods would provide more useful information; the Corps and Ecology, in consultation with the IRT, must approve in advance any changes in the means of gathering or reporting performance data.

**Table 9 Summary of Annual Monitoring Tasks**

BC Mitigation Project Site Year*	Report name	Performance Standard	Monitoring Task	Monitoring Area	Expected Site Visits
<b>Year 0</b>	<b>As-built Reports and Drawings</b>	1.2.1.	Submittal of grading, earthwork, large wood, and habitat features as-built	Entire BC site	90 days after completion
		1.2.2.	Submittal of planting as-built	Entire BC site	90 days after completion
<b>Year 1</b>	<b>Year 1 Monitoring Report</b>	2.2.1., 2.3.1.	Collect plant density for planted native shrub and tree species	Woody wetland (forested and scrub-shrub) and upland (riparian upland enhancement)	July to September, once per monitoring year
		2.4.1.	Full site survey for zero-tolerance invasives: Class A weeds designated for control by County Weed Board, purple loosestrife, and non-native knotweed	Entire BC site	July to September, once per monitoring year
		2.4.2	Collect qualitative data on non-native invasive species	Within each habitat type	July to September, once per monitoring year
<b>Year 3</b>	<b>Year 3 Monitoring Report</b>	2.1.1.	Collect hydrology data over site	Entire BC site	Multiple events, February to June
		2.2.2., 2.3.2.	Collect aerial cover data for native tree and shrub species	Woody wetland (forested and scrub-shrub) and upland (riparian upland enhancement)	July to September, once per monitoring year
		2.2.3.	Collect aerial cover data for native emergent species	Emergent Wetland	July to September, once per monitoring year

		2.4.1.	Full site survey for zero-tolerance invasives: Class A weeds designated for control by County Weed Board, purple loosestrife, and non-native knotweed	Entire BC site	July to September, once per monitoring year
		2.4.2.	Collect cover data on non-native invasive species	Within each habitat type	July to September, once per monitoring year
<b>Year 5</b>	<b>Year 5 Monitoring Report</b>	2.1.2.	Conduct wetland and OHWM delineations	Entire BC site	Multiple events, February-June
		2.2.2., 2.3.2.	Collect aerial cover data for native tree and shrub species	Woody wetland (forested and scrub-shrub) and upland (riparian upland enhancement)	July to September, once per monitoring year
		2.2.3.	Collect aerial cover data for native emergent species	Emergent Wetland	July to September, once per monitoring year
		2.4.1.	Full site survey for zero-tolerance invasives: Class A weeds designated for control by County Weed Board, purple loosestrife, and non-native knotweed	Entire BC site	July to September, once per monitoring year
		2.4.2.	Collect cover data on non-native invasive species	Within each habitat type	July to September, once per monitoring year
<b>Year 7</b>	<b>Year 7 Monitoring Report</b>	2.2.2., 2.3.2.	Collect aerial cover data for native tree and shrub species	Woody wetland (forested and scrub-shrub) and upland (riparian upland enhancement)	July to September, once per monitoring year
		2.2.3.	Collect aerial cover data for native emergent species	Emergent Wetland	July to September, once per monitoring year
		2.4.1.	Full site survey for zero-tolerance invasives: Class A weeds designated for control by County Weed Board, purple loosestrife, and non-native knotweed	Entire BC site	July to September, once per monitoring year
		2.4.2.	Collect cover data on non-native invasive species	Within each habitat type	July to September, once per monitoring year
<b>Year 10</b>	<b>Year 10 Monitoring Report</b>	2.1.2.	Conduct wetland and OHWM delineations, and rate the wetland(s)	Entire BC site	Multiple events, February-June
		2.2.2., 2.3.2.	Collect aerial cover data for native tree and shrub species	Woody wetland (forested and scrub-shrub) and upland (riparian upland enhancement)	July to September, once per monitoring year

		2.2.3.	Collect aerial cover data for native emergent species	Emergent Wetland	July to September, once per monitoring year
		2.4.1.	Full site survey for zero-tolerance invasives: Class A weeds designated for control by County Weed Board, purple loosestrife, and non-native knotweed	Entire BC site	July to September, once per monitoring year
		2.4.2.	Collect cover data on non-native invasive species	Within each habitat type	July to September, once per monitoring year

## A. Protocols

### ***Protocol for demonstrating wetland hydrology (P.S. 2.1.1.)***

In Year 3, the extent of hydrology within the BC Mitigation Project Area will be determined by presence of one primary or two or more secondary hydrology indicators outlined in the *Corps of Engineers Wetland Delineation Manual* (USACE, 1987) and *Regional Supplement: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE, 2010, or as revised; “WMVCR Supplement”). Data collected from shallow groundwater wells and/or surface water gauges may be used to verify wetland hydrology during the growing season. Field observations of wetland hydrology indicators, which will include the use of paired test pits to measure water levels, will be augmented with the water level data where applicable. Per WMVCR Supplement criteria, documentation (notes and photos) of indicators used to determine growing season will be provided, and precipitation analyses will be performed to document whether precipitation/climate conditions were dry, normal, or wet during the Year 3 growing season. Recent orthophotography or LiDAR elevations (taken within one year of the monitoring year) can be useful to show wetland saturation and hydrology but require field verification. Collect wetland hydrology data March-June, or prior to March if growing season indicators are present.

### ***Protocol for mapping wetlands and river features (P.S. 2.1.2.)***

In Years 5 and 10, document the combined wetlands and aquatic habitat features in the site. Conduct a wetland delineation according to the *Corps of Engineers Wetland Delineation Manual* (USACE, 1987) and WMVCR Supplement (USACE, 2010, or as revised). The delineations will include identifying and mapping the combined aquatic features (see bullet below). Year 5 documentation will be in a memo format (including data sheets, delineation map(s), normal precipitation assessment, etc.). Year 10 documentation will be a full report that includes the wetland rating(s) per *Washington State Wetland Rating System for Western Washington* (Hruby & Yahnke, 2023, or as revised). Both Year 5 and 10 delineations shall be flagged in the field and will require Corps verification.

The Year 5 wetland delineation memo and Year 10 wetland delineation report must also include the following:

- A brief description and references for methodology used (both for wetland delineation and for delineating OHWM and “floodplain features”);
- The names of staff conducting the delineation;
- Dates of field work;

- Explanation of any “Difficult Wetland Situations” methods used (see Chapter 5 of the WMVCR Supplement);
- Analysis of whether “normal” precipitation conditions were present at the time when delineation field work was conducted;
- Data sheets with paired plots;
- Wetland rating form(s) (Year 10 only);
- Map showing the delineated boundaries of wetlands. The map must include all sample plot and photo point locations and site topography (if available); and
- A map of the floodplain features outside of delineated wetlands (these can be included in the wetland delineation map). Floodplain features are defined as re-established wetlands altered by riverine processes and may include channels, permanently or seasonally disconnected side channels, abandoned channels, isolated or altered backwaters and pools, and depositional areas such as sand/ gravel bars and shelves, and other accumulations as a result of flooding.

Use a sub-meter accuracy Global Positioning System (GPS) to map features in the field. Recent orthophotography or LiDAR elevations (taken within one year of the monitoring year) can be used to assist in mapping wetland boundaries but require field verification.

#### ***Protocol for vegetation sampling plot selection and layout***

Sampling plots will be established to measure plant density and percent cover to assess site progress in meeting performance standards. A stratified random sampling approach as described in Elzinga et al. (1999) will be used to collect data for performance standards related to vegetation (P.S. 2.2.1., 2.2.2., 2.2.3., 2.3.1., 2.3.2., 2.4.1., and 2.4.2.).

The four habitat types (i.e., vegetation communities) for monitoring are: (1) Wetland Re-Establishment Emergent, (2) Wetland Re-Establishment Forested/Scrub-Shrub, (3) Riparian Upland Enhancement, and (4) Riparian Upland Preservation (weeds only). Each individual plot will be located in one of the above four habitat types based on as-built plans (if available).

A minimum of 1% of the total acreage of each habitat type (excluding wetland re-establishment emergent) will be sampled (**Table 10**). For wetland re-establishment emergent, a minimum of three plots per acre (with a minimum of three plots total if less than one acre) will be sampled. The random plot locations will be evaluated to confirm their relatively even distribution across individual habitat types and the credit-generating areas. Additional plots may be added during field sampling if warranted.

#### ***Sample Plot Sizes:***

Sample plot sizes and stratification is based on potential vegetation height planted in the habitat area, not actual height.

Forested/scrub-shrub and upland communities will be sampled with a 4.6-meter (15-foot) radius circle (area of the sample plot equals 66.5 square meters [707 square feet]).

Emergent communities will be sampled with a 0.9-meter (3-foot) radius circle (area of the sample plot equals 2.6 square meters [28 square feet]).

**Table 10 Sample Plots by Habitat Type Strata**

Habitat type	Total Area (ac)	Total Area (sq. m)	Plot size (sq. m)	# of circle plots for native density and/or cover	# of circle plots for invasive cover	% of area surveyed <sup>a</sup>
<b>Wetland Habitat</b>						
<i>Re-establishment</i> Forested / Scrub-shrub	2.062	8,345	66.5	3	3 <sup>b</sup>	2%
<i>Re-establishment</i> Emergent	0.547	2,214	2.5	3	3 <sup>b</sup>	na
<b>Upland Habitat</b>						
<i>Enhancement</i> Riparian Upland Enhancement	0.488	1,975	66.5	3	3 <sup>b</sup>	10%
<i>Preservation</i> Riparian Upland Preservation	1.862	7,535	66.5	0	3 <sup>c</sup>	3%
<b>TOTAL PLOTS</b>				<b>9</b>	<b>12</b>	

<sup>a</sup> Wetland re-establishment emergent is based on 3 plots per acre, not a percentage of the habitat area.

<sup>b</sup> The plots used to measure native density and cover will be used to measure invasive cover.

<sup>c</sup> Randomly selected circle plots will be used to measure invasive cover only in these areas.

*Plot Location Layout:*

Randomly selected plot locations will be field verified using a hand-held GPS. If a plot is determined to be unusable during field layout and/or sampling (e.g., lies in the middle of an access path, affected by beaver activity, in the middle of a log jam, etc.), another randomly located plot in the same habitat type will be substituted or the plot will be shifted.

A standard plot shape (i.e., circle) will be used for monitoring. Where site conditions or habitat types warrant, a different shaped monitoring plot may be used to limit the sample to a single habitat type. The revised plot will have the same area as the circle plot. The plot shape, size, and location will be recorded in the field and documented in the monitoring report along with an explanation of why the change in plot shape was necessary.

Final plot locations will be shown on maps in monitoring reports, and the same plot locations will be sampled during each monitoring period, unless determined unusable during field sampling. In future monitoring years, changing vegetation community types resulting from natural processes may require plots to be relocated or to change in size. If more than one habitat type is present in the same plot, then the plot designation will be determined based on the dominant vegetation community contained in the majority of the plot and monitored accordingly, and/or be moved in a direction to fully encapsulate whatever habitat type is being monitored. The Corps and Ecology, as Co-chairs of the IRT, will be notified in the monitoring report and maps provided in the monitoring report will document new or shifted plot locations.

***Protocol for determining density of native shrubs and trees (P.S. 2.2.1. and P.S. 2.3.1.)***

In each sampling plot, count the number of live planted shrub and tree stems and record by species. The base of a plant must fall within the sample plot to be counted.

For each plot, note potential reasons for high mortality and any other relevant information, and suggest adaptive management measures such as other species to replant or additional maintenance measures.

Calculate the average stem density of living, installed native trees and shrubs per acre and compare to the relevant performance standard.

Monitor the habitat types (Wetland Re-establishment Forested/Scrub-Shrub and Riparian Upland Enhancement) in Year 1. Monitoring for vegetation will be conducted towards the end of the summer but before leaf drop (end-July through mid-September).

***Protocol for estimating percent aerial cover of native woody vegetation (P.S. 2.2.2. and P.S. 2.3.2.)***

In each sampling plot:

1. For each individual native woody species, visually estimate the absolute percent cover<sup>3</sup> (not to exceed 100%).
2. For all combined native trees and shrubs, visually estimate the overall percent cover<sup>4</sup> (not to exceed 100%).

Cover estimates will not be divided into different vertical strata. Volunteer trees and shrubs of desirable native species taller than one foot should be included in cover estimates. Include native trees and shrubs that are rooted outside the plot but leaves and branches extend into the plot (Exception: do not include cover of plants that are rooted on a different topographic surface that does not reflect the conditions in the plot itself). Exclude pre-existing vegetation from cover estimates.

Record cover values using cover classes as follows:

- If a minimum of 5% cover, use cover class intervals of 5% (e.g., 5%, 10%, 15%, etc.).
- If less than 5% cover, use cover class intervals of 1% (e.g., 1%, 2%, 3%, or 4%).
- If present but less than 1% cover, note that cover is less than 1%.

Where it occurs in a sample plot, record the percent areal cover of bare soil and open water. For each plot, note any potential reasons for high mortality and any other relevant information, and suggest adaptive management measures such as other species to replant or additional maintenance measures.

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<sup>3</sup> The percentage of the ground surface within the sample plot that is covered by the combined aerial portions (e.g., leaves, stems, flowers, etc.) of the individual species.

<sup>4</sup> The percentage of the ground surface within the sample plot that is covered by the combined aerial portions (e.g., leaves, stems, flowers, etc.) of the target group (e.g., native woody trees and shrubs). If one native species overlaps a different native species of the same target group, it will count as one cover estimate. This cover estimate will be compared to the appropriate performance standard.

To determine achievement of the performance standard, calculate the average overall percent cover for the combined native trees and shrub visual estimates within each habitat type and compare to the relevant performance standard.

Monitor the habitat types (Wetland Re-establishment Forested/Scrub-Shrub and Riparian Upland Enhancement) in Years 3, 5, 7, and 10. Monitoring for vegetation will be conducted towards the end of the summer but before leaf drop (end-July through mid-September).

***Protocols for estimating percent aerial cover of native emergent vegetation (P.S. 2.2.3.)***

In each sampling plot:

1. For each individual native emergent species, visually estimate the absolute percent cover (not to exceed 100%).
2. For all combined native emergent vegetation, visually estimate the overall percent cover of the entire plot (not to exceed 100%).

Cover estimates will not be divided into different vertical strata. Include emergent plants that are rooted outside the plot, but leaves extend into the plot. Volunteer native emergent vegetation should be included in cover estimates.

Record cover values using cover classes as follows:

- If a minimum of 5% cover, use cover class intervals of 5% (e.g., 5%, 10%, 15%, etc.).
- If less than 5% cover, use cover class intervals of 1% (e.g., 1%, 2%, 3%, or 4%).
- If present but less than 1% cover, note that cover is less than 1%.

Where it occurs in a sample plot, record percent of the plot ground surface area covered in bare soil and unvegetated water. For each plot, note any potential reasons for high mortality and any other relevant information, and suggest adaptive management measures such as other species to replant or additional maintenance measures.

To determine achievement of the performance standard, calculate the average overall percent cover for the combined native emergent vegetation visual estimates and compare to the relevant performance standard.

Monitor the habitat type (Wetland re-establishment emergent) in Years 3, 5, 7, and 10. Monitoring for vegetation will be conducted towards the end of the summer but before leaf drop (end-July through mid-September).

***Protocol for estimating percent cover of invasive and noxious species (P.S. 2.4.1. and P.S. 2.4.2.)***

In Wetland Re-Establishment Forested/Scrub-Shrub, Wetland Re-Establishment Emergent, and Riparian Upland Enhancement, the same sampling plots used for native vegetation density and/or cover measurements will be used to measure invasive and noxious weed cover. In Riparian Upland Preservation, circle plots will be established and used to measure invasive and noxious weed cover (**Table 10**).

In each plot, visually estimate the absolute percent cover (not to exceed 100%) for each individual non-native invasive and noxious species listed in the performance standards using the

above methods for native woody and emergent species. Note any zero-tolerance invasive species outside of monitoring plots across the entire site.

Calculate the average percent cover of non-native species listed in performance standards and compare to the relevant performance standard.

Monitor invasive and noxious weed species in sampling plots qualitatively through a visual assessment in Year 1 and quantitatively in Years 3, 5, 7, and 10. Monitoring for invasive and noxious vegetation will be conducted towards the end of the summer but before leaf drop (end-July through mid-September).

## ***B. Reporting***

### **1. As-Built Report and Drawings**

An as-built report will be submitted to the IRT upon the completion of construction to verify topography, hydrology, habitat features, and planting. At a minimum, the following components should be included in the as-built reports:

- Name and contact information for the parties responsible for the mitigation site construction;
- Ecology, Corps, and Local permit numbers;
- Dates when activities began and ended such as grading, installation of the large wood, removal of invasive plants, plant installation, habitat feature installation, etc.;
- Description of any problems encountered, and solutions implemented (with reasons for changes) during construction of the mitigation site;
- Maps showing topography, mitigation habitat areas (wetland re-establishment and upland enhancement/preservation), plant communities (as listed in the planting tables) installed, locations, sizes, and quantities of installed large wood, snags, and brush piles (with funding source identified if other than KC MRP), photopoint locations, locations of post-construction monitoring wells (if installed), etc.; and
- Maps documenting as-built changes from the approved design.

### **2. Monitoring Reports**

At a minimum, monitoring reports will include the following elements:

- An overview of the current ecological condition of the mitigation site;
- Data summary description and tables (include raw data in an appendix);
- Description of monitoring methods, noting any changes from specifications in the mitigation plan (can be included in the appendix);
- Assessment of applicable performance standards and whether they were achieved - include tables which list the applicable performance standards for the monitoring year, and whether or not each performance standard was met, along with any corrective actions proposed;
- Description and schedule of maintenance actions undertaken since the previous monitoring report and maintenance actions recommended to keep the site on course to satisfy performance standards;

- Discussion about the likely causes and impacts of any setback or failure that occurred and recommendations for future actions and strategies that might resolve those problems;
- Observations of fish and wildlife use of the site;
- Observations of large wood or snags encountered during monitoring site visits;
- Photographs of the site;
- Dates monitoring was conducted and names of who conducted the monitoring;
- Monitoring map(s) based on the as-built maps showing the planting areas and locations of the following pertinent: large wood; monitoring plots/transects; post-construction monitoring wells, if present; photo points; signs; etc. and
- Other elements requested by the IRT.

The monitoring report must document any IRT-approved changes to the monitoring methods.

## **XI. Maintenance Plan**

Maintenance plays an important role in successfully establishing vegetation at a project site and addressing unacceptable impacts and damage (**Table 11**). The goal of the maintenance plan is to ensure the mitigation project performance standards are met.

Site maintenance will be managed by King County staff during the 10-year establishment period. Maintenance crews will manually and chemically treat invasive vegetation and if needed, dense grass to reduce competition for moisture and nutrients. Licensed staff will use suitable herbicides in accordance with King County best management practices and the manufacturer’s label. Crews will report back to King County staff with any damage (animal browse, beaver presence, vandalism, unknown cause of mortality), notice of new weed infestations, or other issues observed on site. Long-term management of the site may be transferred to another King County workgroup (i.e., King County Parks) following IRT approval.

### **A. Beaver Management**

Beaver impacts have been observed downstream from BC Mitigation Project site and, thus, are expected at this site. Beaver activity at the BC Mitigation Project site has the potential to influence WSE. A Beaver Management Plan will help guide decision-making related to beaver management (King County, 2024b). While this could have minor impacts on wetland performance through excessive inundation or beaver browse, the overall ecological function is expected to remain high with minimal adaptive management needs. Changes to WSE within the BC Mitigation Project site may alter vegetation communities and wetland types. These natural changes fundamentally enhance and re-establish wetland functions. If beavers begin to dam the mainstem of Boise Creek, especially within the upstream end of the site, and raise water surface along the stream corridor, there is potential for impacts from inundation on private property on the right bank of the stream and, thus, would require adaptive management action.

As noted above in Section VI Mitigation Work Plan, various measures will be implemented to reduce the likelihood of beavers building sustainable dams within the mainstem of Boise Creek; however, these measures will not eliminate the risk. Regular monitoring and inspection of the BC Mitigation Project site and Boise Creek stream corridor within and about 100 feet upstream

and downstream of the BC Mitigation Project site will be performed to determine if any dam building in the mainstem of Boise Creek is occurring. The number of onsite inspections will be determined by the level of activity observed in areas sensitive to inundation (**Table 11**). Continuously recording water level gages have been installed on the site on the left bank of Boise Creek to establish a pre-project baseline dataset of WSEs. Data from these gages may be used post-project, if available, to supplement observations during onsite inspections.

Using elevation and existing land use data, pre-project WSEs along the stream corridor during the drier months of June to October will be established to compare any potential changes in WSE observed post-project to baseline (pre-project) conditions. If any beaver dams built within the BC Mitigation Project site and Boise Creek stream corridor in the project reach impound water above acceptable levels during the months of June to October and sufficient to inundate areas beyond the boundaries of the BC Mitigation Project site, adaptive management actions may be considered.

These actions may include, but are not limited to:

- Intensive monitoring of WSE and dams via telemetered gages and increased site inspections;
- Beaver exclusion fencing, if feasible;
- Notching or removal of beaver dams per Hydraulic Project Approval conditions;
- Installation of flexible levelers (beaver deceivers) or notch exclusion fencing, if permitted and effective;
- Analogue dams built in the most manageable locations;
- Hiring trappers to lethally trap beavers in the project area;
- Construction of berm(s) in areas where this strategy could be effective in redirecting problematic surface water flow; and
- Negotiate flood easements or acquisitions with willing adjacent landowners.

### ***B. Plant Replacement***

Ungulate browsers, voles, beavers, birds, human vandalism, flooding, and changing site conditions may damage plantings. If damage is extensive or slow growth prevents the project from meeting performance standards, supplemental plantings may be added to increase cover. If plants die because the hydrology/hydroperiod is different than expected or has changed due to beaver activity that raises WSE in the site, substitute native plant species with a more suitable life-history will be installed. If plants become flooded due to inundation by beaver, areas with standing water will not be replanted.

### ***C. Large Wood Structure Inspection***

Floodplain wood was designed to be racked on wood pilings, topographic highs, or live trees and to recruit additional natural wood. The wood may shift and move within the project area. Connections to Beaver and Boise creeks were sized and designed to reduce the potential for geomorphic response in the main channels which could result in adverse off-site impacts, but additionally would limit the potential for large wood pieces to be exported from the site. Most, if not all, of the wood is not expected to leave the site. If the monitoring ecologist lead notices heavy wood accumulations at outlets or other potential site safety and stability concerns, the

project engineer or equivalent will inspect the issue and determine the appropriate adaptive management action.

**Table 11 Maintenance Tasks**

Tasks	Description	Effort	Timing	Frequency
<b>Public Access</b>	Assess recreational use and illegal encampments	Note informal trails, remove encampments, and address damage	On maintenance visits	At least twice annually
<b>Trash Removal</b>	Remove trash	As needed, where feasible	On maintenance visits	At least twice annually
<b>Mitigation Project Signage</b>	Maintain, repair, and replace	As needed	n/a	n/a
<b>Weed Assessment &amp; Treatment</b>	Control all invasive weeds identified in performance standards	Control chemically, mechanically, or manually	As required for each weed species encountered	At least annually or as needed to meet performance standards
<b>Plant Replacement</b>	Replace dead plants and/or add new plants if performance standards unmet, except in areas newly inundated by beavers.	Adjustments to quantity and size will be made to ensure native cover performance standards are obtainable. If beavers have caused new inundation, different plant species may be planted if water depth is acceptable and/or the community has changed.	Fall through spring	Annually during Years 3, 5, 7, 10 or as needed to meet performance standards
<b>Maintenance Logs</b>	Keep maintenance records and logs	Document activities; timing, cost, results	Summarized in monitoring reports	To be summarized in monitoring reports

<p><b>Beaver Management</b></p>	<p>Monitor and inspect site for beaver activity</p>	<p>As needed</p>	<p>Year-round</p>	<p>Biweekly from July-December if beaver activity present in stream. Monthly from January to June if beaver activity is present in the stream. Monthly to quarterly site visits year-round if no beaver activity within the stream corridor. Year-round data collection via gages at key water level monitoring stations, if needed.</p>
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## XII. Credit Release Schedule

Table 12 Credit Release Schedule

Boise Creek Mitigation Project Credit Release Schedule								Total Credits	67.582
	Pre Construction Credits <sup>1</sup>	Year 0 Credits <sup>2, 3</sup>	Year 1 Credits <sup>4</sup>	Year 3 Credits	Year 5 Credits	Year 7 Credits	Year 10 Credits <sup>5</sup>	Total Credits	
<b>Objective 1.1. Permanent Protection</b>									
1.1.1. Approved Mitigation Plan	3.154							3.154	
1.1.2. Legal Protections Property	3.154							3.154	
1.1.3. Permits	3.154							3.154	
<b>Objective 1.2. Construction</b>									
1.2.1 Grading/Earthwork and Large Wood Installed		6.620						6.620	
1.2.2. Planting Complete		4.228						4.228	
<b>Objective 2.1. Wetland and Aquatic Habitat</b>									
2.1.1. Hydrology				3.980				3.980	
2.1.2. Minimum Wetland Acreage					5.721		5.721	11.442	
<b>Objective 2.2. Native Vegetation in Wetland</b>									
2.2.1. Woody Planting Density (Forested/Scrub Shrub Wetland)			2.355					2.355	
2.2.2. Aerial Cover (Forested/Scrub Shrub Wetland)				2.355	2.355	2.355	2.355	9.420	
2.2.3. Aerial Cover (Emergent Wetland)				0.800	0.800	0.800	0.800	3.200	
<b>Objective 2.3. Native Vegetation in Upland Planting Areas</b>									
2.3.1. Woody Planting Density (Riparian Upland Enhancement)			0.802					0.802	
2.3.2. Aerial Cover (Riparian Upland Enhancement)				0.802	0.802	0.802	0.802	3.208	
<b>Objective 2.4. Non-Native and Noxious Weeds</b>									
2.4.1. Cover of Invasive Species (zero tolerance)			1.425	1.425	1.425	1.425	1.425	7.125	
2.4.2. Cover of Invasive Species (10%-20% tolerance)				1.435	1.435	1.435	1.435	5.740	
<b>Total Credits Available in the Period</b>	<b>9.462</b>	<b>10.848</b>	<b>4.582</b>	<b>10.797</b>	<b>12.538</b>	<b>6.817</b>	<b>12.538</b>	<b>67.582</b>	
Percentage of Credits Available	14%	16%	7%	16%	19%	10%	19%		
Cumulative Percentage of Credits Available	14%	30%	37%	53%	71%	81%	100%		

<sup>1</sup> WAC 173-700-331 states that up to 14% of the potential credits for a mitigation bank may be released at preconstruction

<sup>2</sup> Year 0 is the calendar year during which all construction is completed.

<sup>3</sup> WAC 173-700-332 states that up to 30% of the potential credits for a mitigation bank (cumulative total including preconstruction credits) may be released when a mitigation bank is constructed and the IRT approves the as-built

<sup>4</sup> Year 1 is the first year of site monitoring following completion of all construction.

<sup>5</sup> WAC 173-700-334 outlines the criteria for a mitigation bank's final credit release. Year 10 credits cannot be released until a Long Term Management and Maintenance Plan is approved.

### **XIII. Adaptive Management Plan**

An adaptive management plan is one way for King County and the IRT to facilitate the successful achievement of mitigation obligations at the BC Mitigation Project site, while at the same time being consistent with natural processes. As described in the Adaptive Management and Contingencies Planning in Appendix O of the Program Instrument.

Adaptive management plans included with mitigation plans will necessarily lack specific measures to address underperformance, since the type of underperformance will not be known at the time the Mitigation Plan is developed. Specific corrective measures will be developed if and when underperformance details become clear. Any and all adaptive management measures will be appended to the Mitigation Plan and the IRT will review and comment on any additions or amendments to Mitigation Plans. (King County, 2012, p.137)

Regular monitoring will be used to determine whether performance standards are being met and may reveal the causes of underperformance and inform possible solutions.

Although many problems may be unforeseeable, a few plausible problem scenarios can be developed for the purpose of scenario or situation-planning. Conditions of concerns can then be described and time-bounded, and a progression of potential actions can be proposed to address each problem scenario. Strategies described below represent examples of progressive steps toward addressing unacceptable project outcomes. Many of the actions listed below would require permits, IRT approval, and King County authorization.

**Table 13 Example Adaptive Management Strategies**

Scenario	Description	Progression of Adaptive Management Strategies
<b>Wetland and/or floodplain acreage shortfall</b>	Post-construction delineations show wetland re-establishment and/or floodplain area is less than expected	<ol style="list-style-type: none"> <li>1. Consult with IRT and appropriate agencies.</li> <li>2. Determine cause of change and investigate alternative means for measuring success.</li> <li>3. Determine if resources tradeoffs are appropriate for impact project compensation.</li> <li>4. Modify soil hydrology by either raising water levels or lowering ground surface.</li> <li>5. Establish additional compensatory wetland areas or adjust credits.</li> </ol>
<b>Excessive erosion</b>	Erosion negatively effects plant establishment	<ol style="list-style-type: none"> <li>1. Plant stakes</li> <li>2. Consult with IRT</li> <li>3. Consider stabilization measures</li> </ol>
<b>Plants fail to thrive</b>	Plant cover performance standards are not met	<ol style="list-style-type: none"> <li>1. Install plants at higher density</li> <li>2. Use different plant species</li> <li>3. Amend soil</li> <li>4. Temporary plant protection from non-avian browsing and/or plant girdling</li> <li>5. Irrigation</li> <li>6. Consult with IRT and appropriate agencies</li> </ol>
<b>Beaver impacts</b>	Plant cover performance standards are not met because of beaver browse or WSE increases	<ol style="list-style-type: none"> <li>1. Install additional plants or beaver exclusion measures</li> <li>2. Consult Beaver Management Plan</li> <li>3. Investigate new or alternative means of excluding beavers from some areas of the site.</li> <li>4. Consult IRT about performance standard changes</li> <li>5. Consult with IRT and appropriate agencies</li> </ol>
<b>Weeds not controlled</b>	Noxious weeds performance standards not met	<ol style="list-style-type: none"> <li>1. Initiate additional invasive removal (e.g. hand; mechanical, or chemical as part of an integrated pest management approach)</li> <li>2. Extend establishment phase</li> <li>3. Consult with IRT and appropriate agencies</li> </ol>
<b>Significant flood event</b>	Significant flood event causes major changes, including total loss of installed wood features, to the BC Mitigation Project site	<ol style="list-style-type: none"> <li>1. Assess changes including safety concerns</li> <li>2. Consult with IRT</li> <li>3. Determine whether performance standards need to be adjusted to accommodate changes</li> </ol>

<b>Vandalism/ un-authorized use</b>	Encampments, dumping, or trail-building damages the site	<ol style="list-style-type: none"> <li>4. Report to King County Sheriff</li> <li>5. Install signage to discourage such activities</li> <li>6. Restrict access (various options)</li> <li>7. Consult with IRT and appropriate agencies, including Sheriff</li> </ol>
<b>Vandalism or damage of onsite gauge(s) if present</b>	Gauge(s), if present, damaged or vandalized during data collection years	<ol style="list-style-type: none"> <li>1. Report vandalism to King County Sheriff</li> <li>2. Salvage available data</li> <li>3. Replace damaged gauge up to three times</li> <li>4. Consult with IRT to identify alternative data collection methods.</li> </ol>

King County retains the flexibility to implement adaptive management actions in consultation with the IRT that are consistent with the larger mitigation objectives. Standard maintenance and minor adaptive management actions (re-planting, weed control, vandalism repair) do not require consultation with the IRT and will be implemented and then reported on in required monitoring reports. Emergency actions to avoid or reduce off-site flooding or damages also do not require prior consultation with the IRT, but the IRT must be informed and/or consulted after emergency action has been taken.

If monitoring results indicate that performance standards are not attainable due to beaver activities or other natural processes, such as deposition, erosion, or channel migration, King County will consult with the IRT on appropriate responses and/or revisions to performance measures. The intent of all parties will be to meet the mitigation obligations without compromising natural processes or implementing actions adverse to the *Salmon Habitat Protection and Restoration Strategy for Puyallup and Chambers Watersheds* (WRIA 10/12, 2018).

**XIV. Site Protection**

The parcels within the BC Mitigation Project site are owned by King County and will be permanently protected by restrictive covenants placed on the title consistent with the requirements of the In-Lieu Fee Program, as described in the Program Instrument.

**XV. Long Term Management and Maintenance Plan**

Long term maintenance of the BC Mitigation Project site refers to monitoring and maintenance beyond the ten-year establishment phase. King County intends for the site to need little or no long-term maintenance, but some maintenance activities may be needed. After the ten-year establishment phase for the BC Mitigation Project will remain in King County’s inventory of public lands. King County Parks will retain long term responsibility for the site and controlling listed noxious weeds as required by law and consistent with King County’s noxious weed control program.

King County, as ILF Sponsor, is responsible for ensuring that a Long-Term Management and Maintenance Plan (LTMMP) is developed and implemented to protect and maintain in perpetuity

the wetland functions and values of the BC Mitigation Project site. This plan must be approved by the Corps and Ecology, following consultation with the IRT, prior to the termination of the establishment phase of the BC Mitigation Project. The LTMMP must be approved before Year 10 credits can be released. Once the establishment phase of the BC Mitigation Project has terminated pursuant to the ILF Instrument, King County will assume responsibility for implementing that LTMMP, unless King County assigns this responsibility pursuant to the provisions of ILF Instrument; it is possible that the Sponsor could assign LTMMP responsibility to the Parks Division. The Sponsor will seek IRT review and approval for any assignment to another King County workgroup or external entity.

To gain IRT approval, the LTMMP will consist of enumerated objectives, performance standards, reporting schedule, and a monitoring/maintenance plan. King County or its approved steward assignee will document that the site is achieving each performance standard and objective in the LTMMP by submitting status reports to the IRT on a schedule approved by the IRT. The purpose of the BC Mitigation Project is to re-establish hydrologically connected wetlands, large wood and other habitat features to improve Boise Creek floodplain function, benefiting fish and wildlife, hydrology, and water quality. In this potentially dynamic floodplain setting, natural changes (i.e., sediment deposition, channel migration, flood deposits) to the vegetative community, other than significant changes caused by noxious and non-native invasive weeds, that occur after all BC Mitigation Project performance standards have been met are not expected to require remediation.

The LTMMP will include those elements necessary to provide long-term protection for the wetland ecosystem and habitat resources of the BC Mitigation Project site. The specific elements of the Plan must be tailored to meet the specific protection needs of the BC Mitigation Project site. At minimum, the IRT will likely find the following core elements to be necessary for inclusion in the LTMMP. The particular characteristics of the BC Mitigation Project site at the end of the establishment period may necessitate including other elements not specified below, that are needed to protect the ecosystem resources present at the site.

- (1) The BC Mitigation Project will be inspected for signs of trespass and vandalism during monitoring visits. Maintenance will include reasonable actions to deter trespass and repair vandalized features.
- (2) Inspect the site to locate and control specified noxious and non-native invasive weeds on the applicable list of noxious weeds maintained by King County and/or as directed by the IRT. The IRT anticipates that this long-term control will involve identifying and eradicating a relatively small number of recurrences. In the event the Corps and Ecology, in consultation with the IRT, determines that the watershed within which the site is located becomes infested with these species in the future, so that their effective control on the BC Mitigation Project site is either no longer practicable or unreasonably expensive, the IRT will consider appropriate changes to the LTMMP.

If the King County elects to request the approval of the IRT to assign long-term management and maintenance to a Long-Term Steward, pursuant to the Program Instrument, the long-term management and maintenance assignment agreement will reflect that the assignee has assumed the obligation, owed to the IRT, of accomplishing the LTMMP.

## XVI. Financial Assurances

As stated in Appendix R of the Program Instrument, the federal rule requires in-lieu fee program sponsors to provide financial assurances “sufficient to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with its performance standards.” (§ 33 CFR 332.4(c)(13)) King County has several safeguards “built in” to the program to ensure adequate funds including:

- Credits prices based on actual project costs;
- A percentage of each fee is directed to a contingency fund;
- A land fee is included in addition to the credit fee;
- An interest-accruing, stand-alone mitigation fund which is protected by code from being used for other purposes; and
- Allocation of interest to the contingency account.

Should the sources of money be insufficient to secure the required number of credits, the MRP is committed to seeking funds through the King County appropriations process in order to meet permit requirements that have been assumed by the program (King County, 2012).

## XVII. Force Majeure

If an event occurs, beyond the reasonable control of King County, which results in significant adverse impacts to the project, the Force Majeure terms of the Program Instrument will apply.

A. Force Majeure: The Sponsor may request, pursuant to Article VI.C. of the Basic Agreement of the Program Instrument, and the Corps and Ecology may approve changes to the construction, operation, project objectives, performance standards, timelines or crediting formula of the Mitigation Reserves Program, pursuant to the standards and procedures specified in applicable Appendices if all of the following occur: an act or event causes substantial damage such that it is determined to be a force majeure; such act or event has a significant adverse impact on the quality of the aquatic functions, native vegetation, or soils of the mitigation site; and such act or event was beyond the reasonable control of the Sponsor, its agents, contractors, or consultants to prevent or mitigate.

1. The evaluation of the damage caused by a force majeure and the resulting changes to mitigation requirements will necessarily involve communication among the Parties and the IRT. If the Sponsor asserts a mitigation site has sustained significant adverse impacts due to an event or act which may be determined to be a force majeure, the Sponsor shall give written notice to the Corps, Ecology, and the IRT as soon as is reasonably practicable. After receiving written notice, the Corps and Ecology, in consultation with the Sponsor and the IRT, shall evaluate whether the event qualifies as force majeure. The Corps and Ecology, in consultation with the Sponsor and the IRT, will then evaluate whether significant adverse impacts have occurred to the site. If a force majeure event is determined to have occurred and significant adverse impacts are found to have occurred to the site, the Corps and Ecology, in consultation with the IRT and the Sponsor, will evaluate whether and to what extent changes to the mitigation site will be in the best interest of the site and the aquatic environment, and

may approve such changes as detailed in paragraph A above. The Corps and Ecology retain sole discretion over the final determination of whether an act or event constitutes force majeure, whether significant adverse impacts to a mitigation site have occurred, and to what extent changes to a mitigation site will be permitted.

2. Force majeure events include natural or human-caused catastrophic events or deliberate and unlawful acts by third parties.
  - a. Examples of a natural catastrophic event include, but are not limited to: a flood equal to or greater in magnitude than the 100-year flood event; an earthquake of a force projected from an earthquake with a return period of 475 years; drought that is significantly longer than the periodic multi-year drought cycles that are typical of weather patterns in the Pacific Northwest; as well as events of the following type when they reach a substantially damaging nature: disease, wildfire, depredation, regional pest infestation, or significant fluviogeomorphic change.
  - b. Examples of a human-caused catastrophic event include, but are not limited to, substantial damage resulting from the following: war, insurrection, riot or other civil disorders, spill of a hazardous or toxic substance, or fire.
  - c. Examples of a deliberate and unlawful act include, but are not limited to, substantial damage resulting from the following: the dumping of a hazardous or toxic substance, as well as significant acts of vandalism or arson.

## **XVIII. Implementation**

Responsibility for completing required mitigation has been transferred to King County as part of agreements with multiple impact project proponents through King County’s state and federally authorized ILF Mitigation Program. King County will implement this mitigation by utilizing a combination of King County resources, contractors, and sub-contractors. While the timing of some actions may be dictated by agreements between King County and these contractors, overall responsibility for meeting these mitigation obligations will remain with King County.

### ***A. Responsible Parties***

Senior Managing Ecologist and ILF Program Manager  
King County Department of Natural Resources and Parks  
201 South Jackson Street  
Suite 6300  
Seattle, WA 98104-3855

### ***B. Reporting***

Once the mitigation plan is constructed and plants installed, King County will provide an “as-built” report and drawings to the IRT. Following construction, the project will be monitored annually for a minimum of 10 years to track the success of the project and identify maintenance needs. Monitoring reports evaluating the success of the project in meeting the stated goals, objectives, and performance standards will be prepared and submitted after Years 1, 3, 5, 7, and 10 of monitoring in accordance with the approved monitoring and maintenance plan.

### **C. Access**

Access to the site will be provided to members of the IRT to verify site conditions and ensure the mitigation is implemented according to the approved plan. The site is publicly owned, so access cannot be denied for passive recreation, such as fishing or bird watching, for members of the public; however, signs will be posted proclaiming the site as a mitigation site and environmentally sensitive area, including language to prevent access using any mode of travel other than walking. While the King County cannot outright exclude members of the public from accessing the portion of the site where King County is implementing the BC Mitigation Project, such public access will not be encouraged. Survey of public use of the site (or lack thereof) will be conducted on monitoring site visits and assessed by King County. Any corrective measures necessary related to public access will be addressed through adaptive management actions in coordination with the IRT.

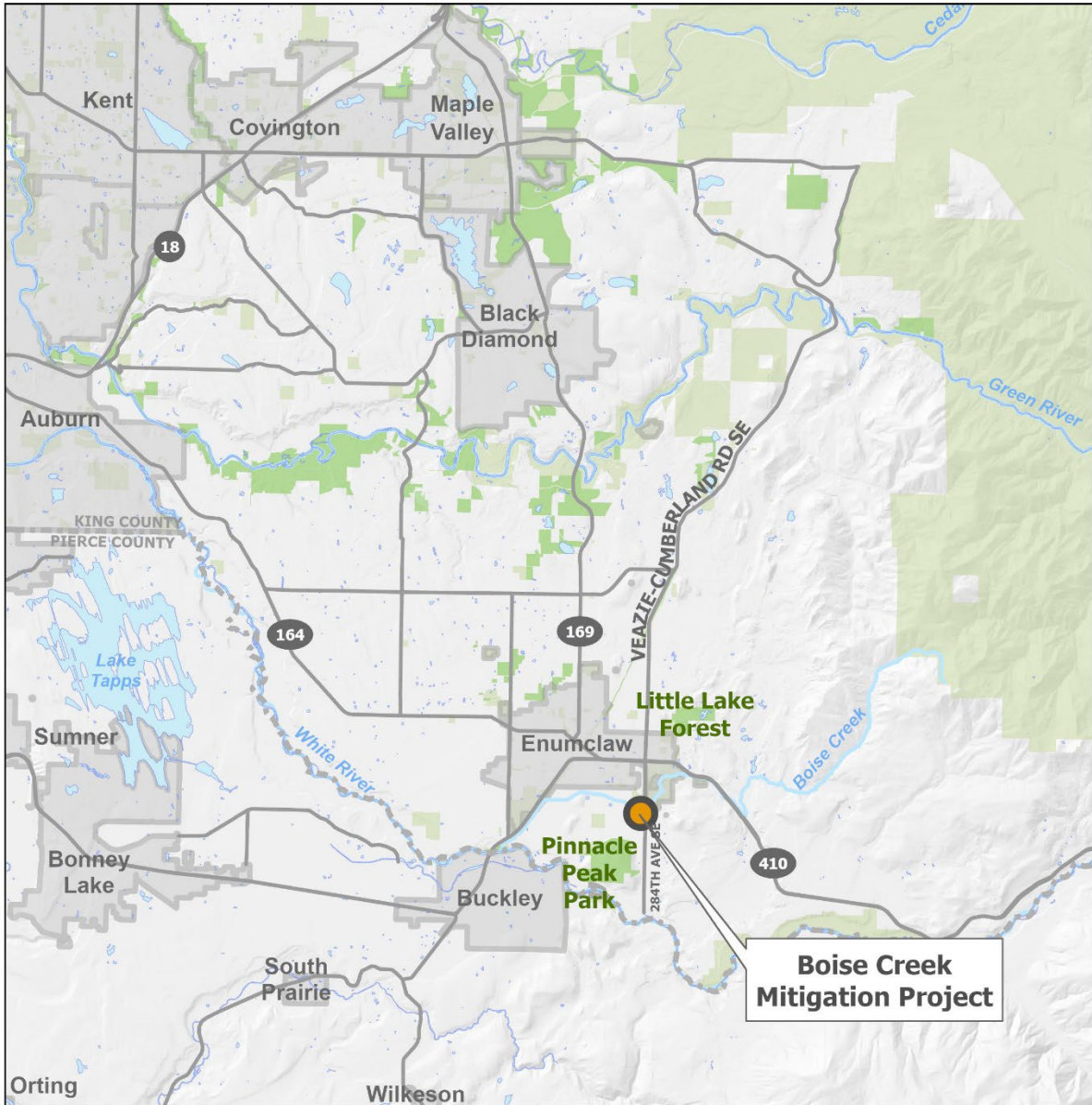
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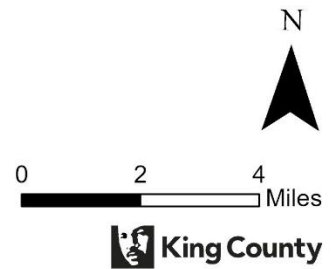
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# Figures

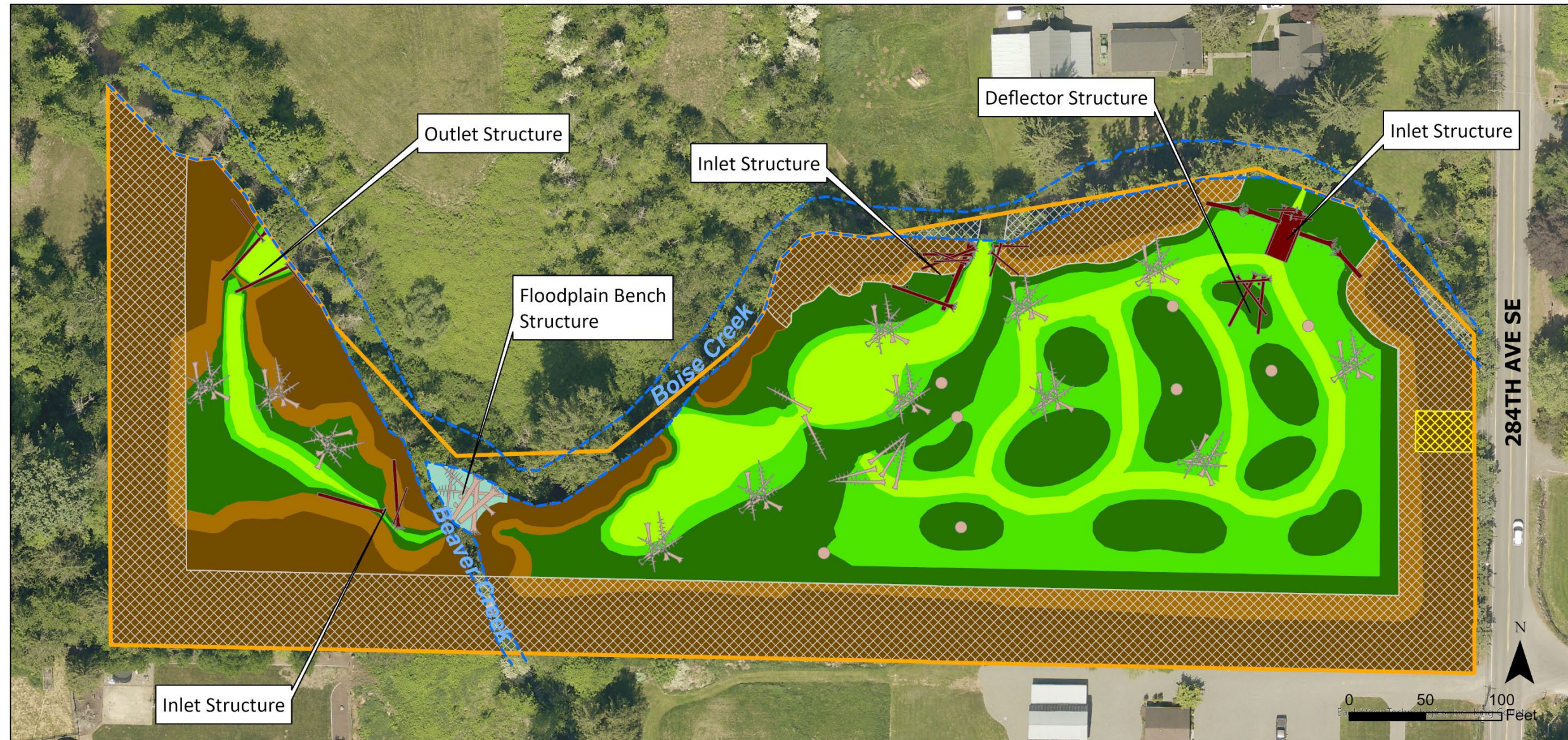


**Boise Creek Mitigation Project  
Vicinity Map**

-  County Boundary
-  Streams
-  Incorporated Cities
-  Parks in King County
-  Streets
-  Public Land in King County
-  Open Water



**Figure 1 Vicinity Map**



**Boise Creek Mitigation Project  
Mitigation Credit Areas**

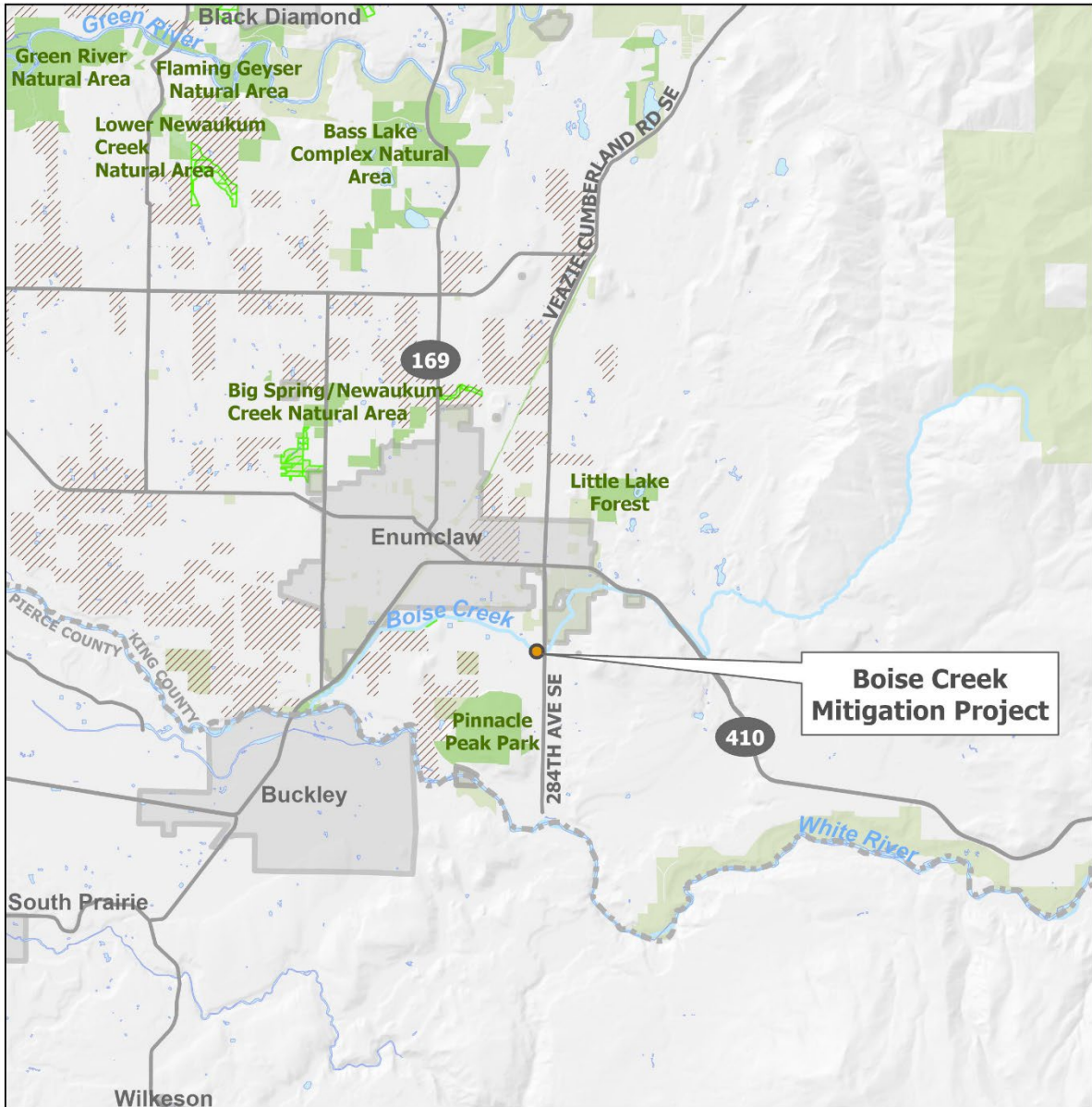
2023 Aerial Image

- |                                                 |                                        |                                          |                      |
|-------------------------------------------------|----------------------------------------|------------------------------------------|----------------------|
| Boise Creek Mitigation Project Site (5.191 ac)* | Scrub Shrub Wetland (0.872 ac)         | <b>Habitat Features Funded by Others</b> | Habitat Structure    |
| Non-Credit Generating Perimeter                 | Forested Wetland (1.190 ac)            | Floodplain Bench (0.030 ac)              | Snag                 |
| Maintenance Parking Area                        | Riparian Upland Enhancement (0.488 ac) | Riparian Upland Preservation (1.862 ac)  | Large Wood Structure |
| OHWM                                            | Large Wood Structure                   | Large Wood Structure                     |                      |
| Emergent Wetland (0.547 ac)                     |                                        |                                          |                      |

\*Includes area below OHWM and on the right bank of Boise Creek.

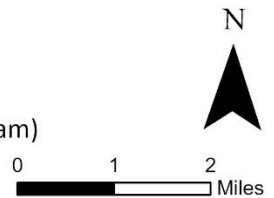


**Figure 2 Mitigation Credit Areas**

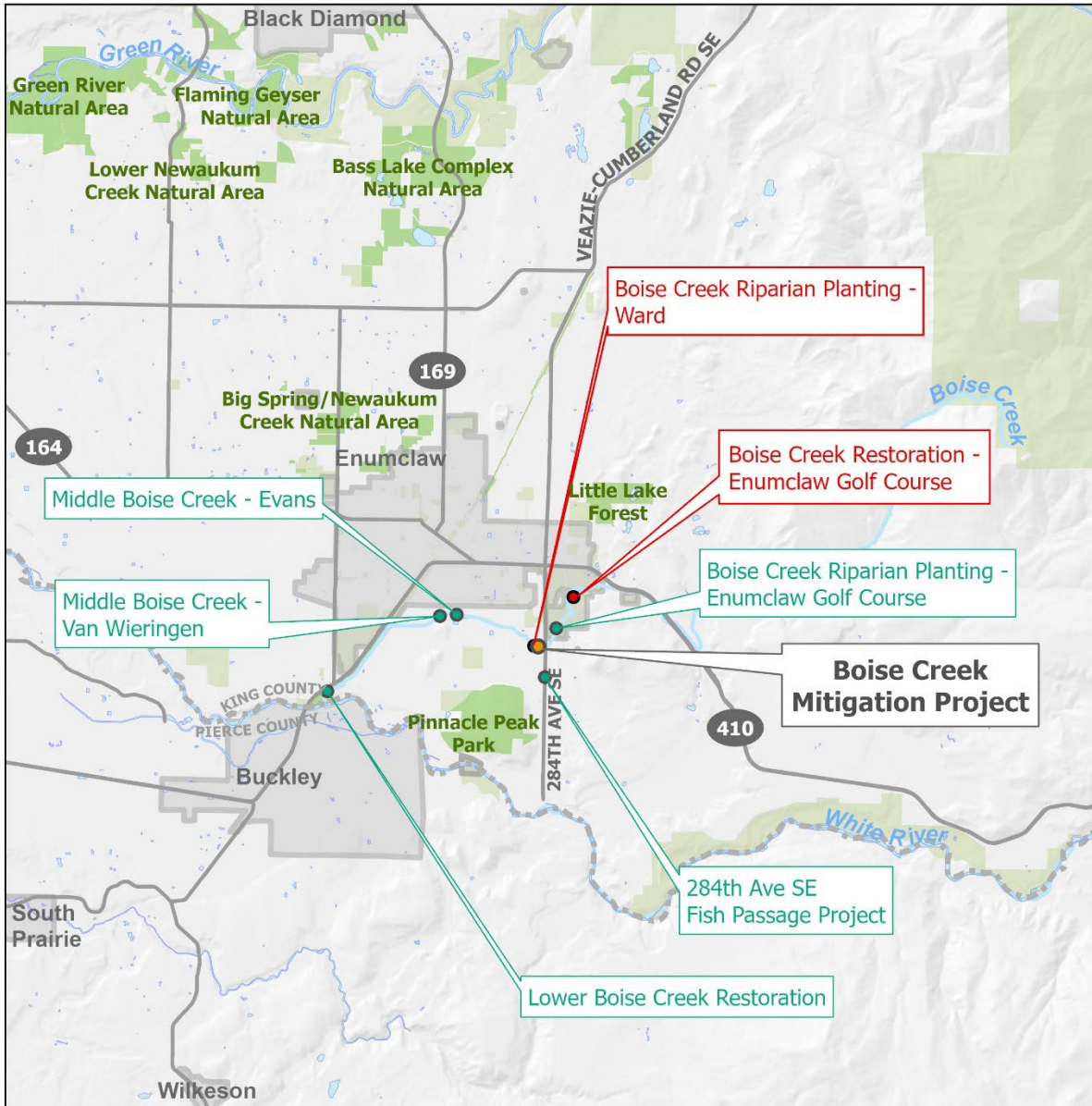


**Boise Creek Mitigation Project  
Public Land and Other Protected Areas**

- County Boundary
- Incorporated Cities
- Streets
- Open Water
- Streams
- Public Land in King County
- Parks in King County
- Park Conservation Easement
- Protected Farmland (Farmland Preservation Program)

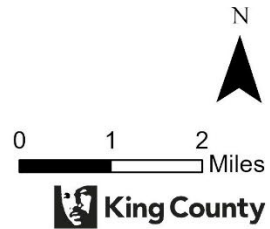


**Figure 3 Boise Creek Area Public Land**

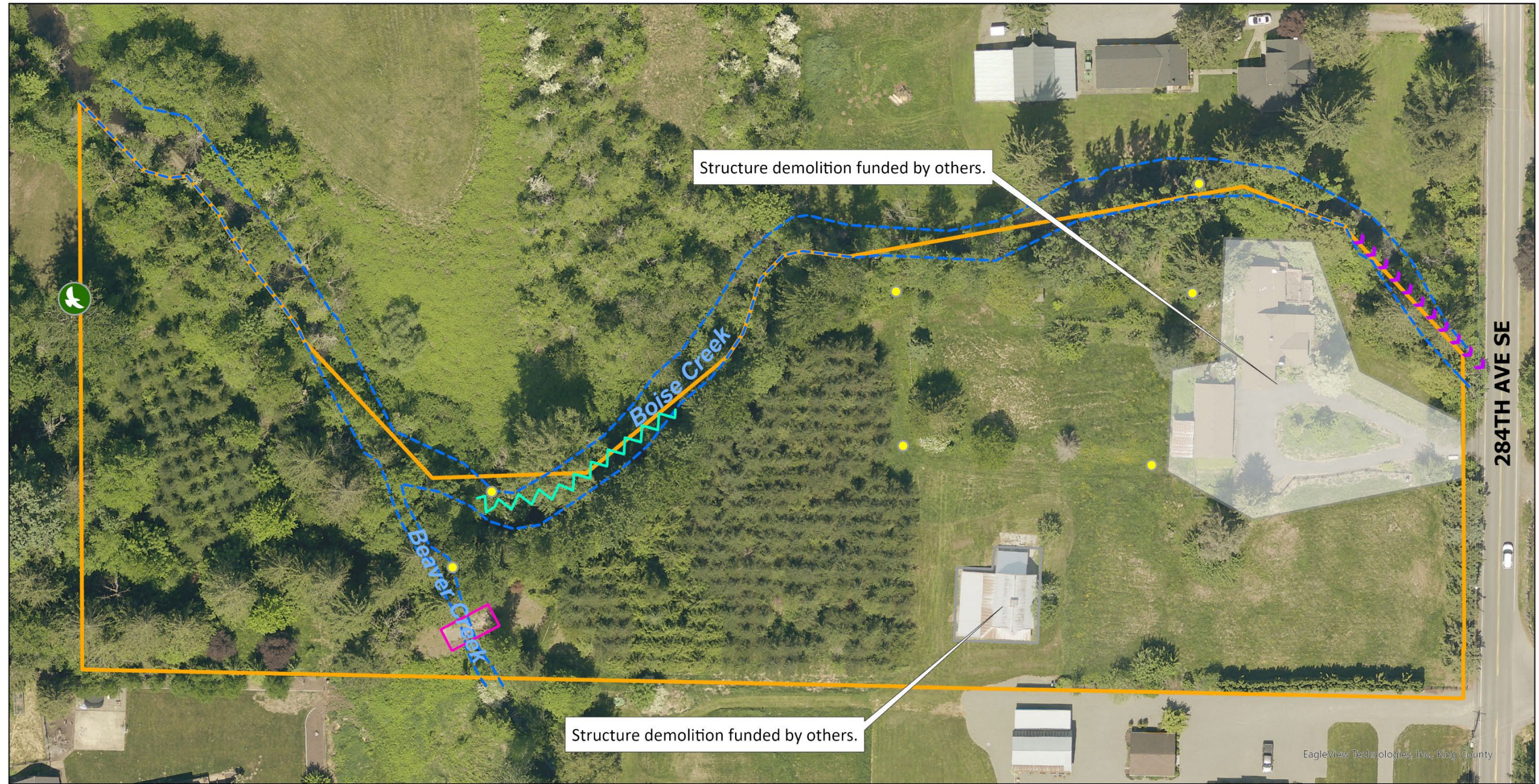


**Boise Creek Mitigation Project  
Restoration Projects**

- Boise Creek Mitigation Project Site
- Completed Project
- Project In Progress
- ▭ County Boundary
- ▭ Incorporated Cities
- ▭ Streets
- ▭ Open Water
- ▭ Streams
- ▭ Parks in King County
- ▭ Public Land in King County



**Figure 4 Boise Creek Area Mitigation and Restoration Projects**



**Boise Creek Mitigation Project  
Baseline Conditions**

2023 Aerial Image

- Boise Creek Mitigation Project Site
- 🦅 Eagle Nest
- ~ Concrete Rubble (To Be Removed)
- - - OHWM
- Monitoring Gage
- >> Retaining Wall
- Concrete Bridge (To Be Removed)



**Figure 5 Baseline Conditions**