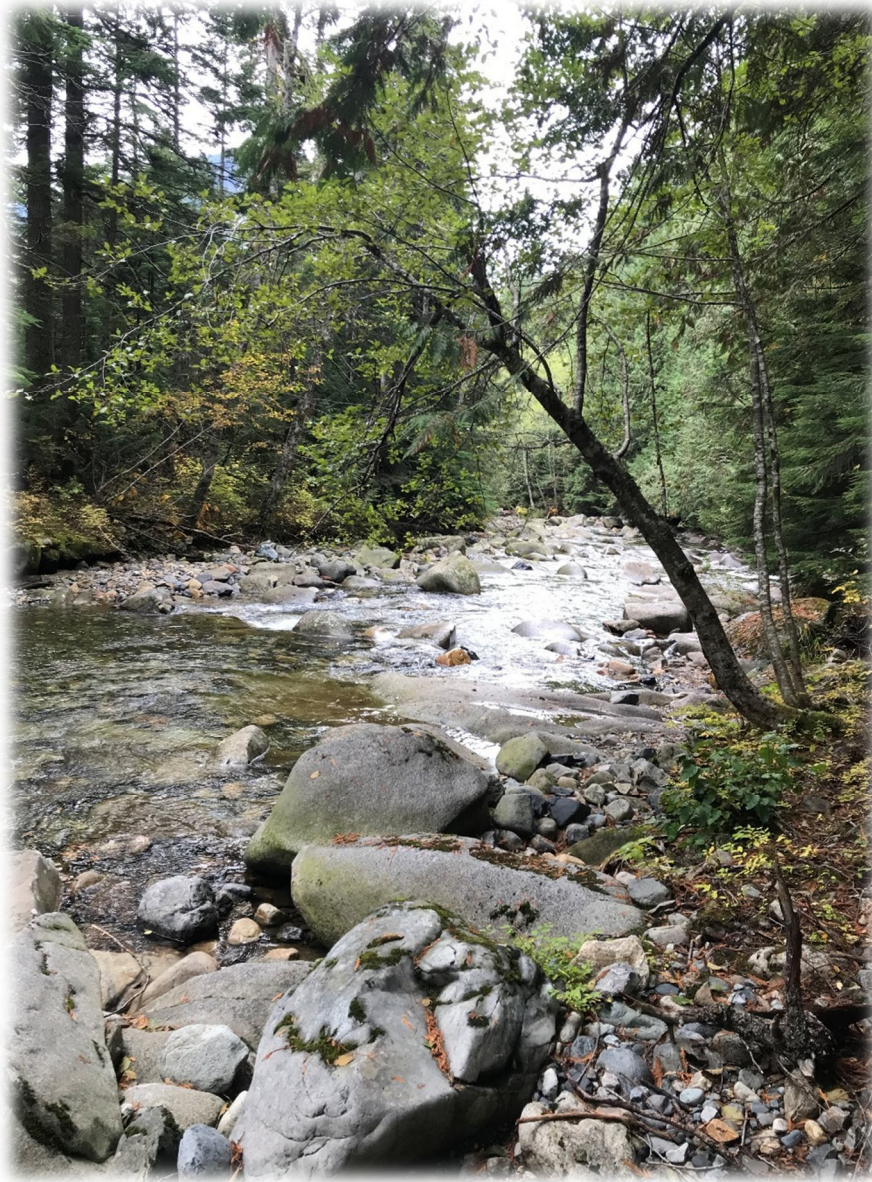


*Mitigation Plan and Wildlife Study*  
*Roan Rock LLC*

Parcel #1822119026  
66XXX SE Denny Creek Road, King County, Washington



*Prepared For:*  
Roan Rock LLC

*Prepared By:*  
Aquatica Environmental Consulting, LLC

November 2023

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## **APPENDIX A**

Priority Habitats and Species Report

## **APPENDIX B**

SBMB Service Area

## **APPENDIX C**

Bond Quantity Worksheet

## 1.0 INTRODUCTION

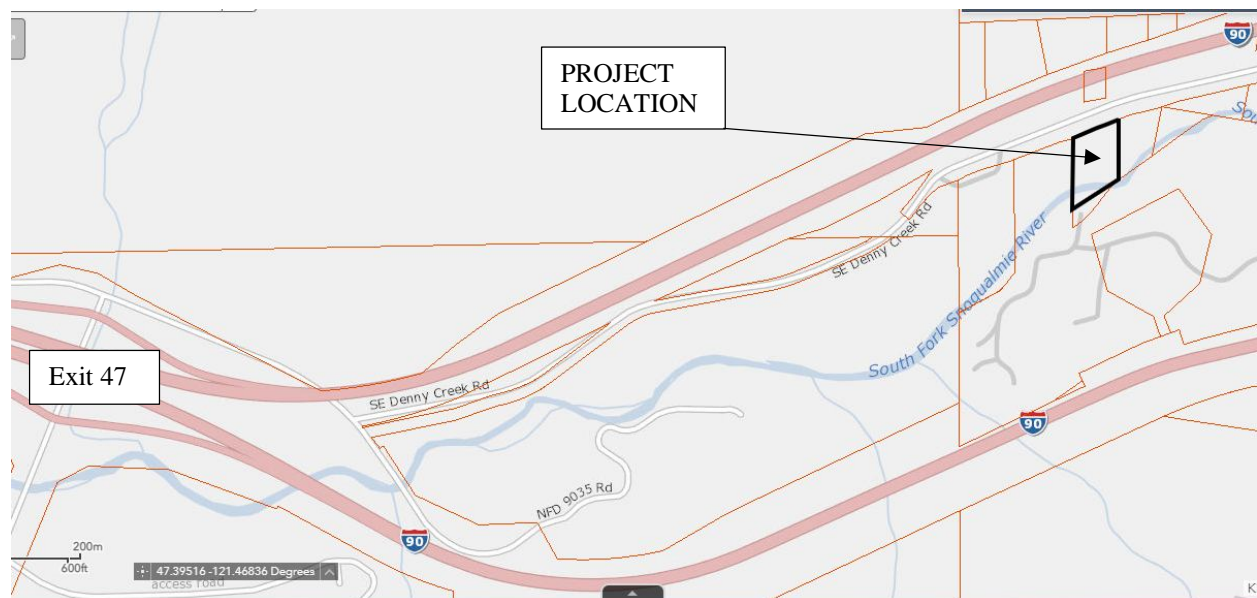
Roan Rock LLC is proposing to develop a cabin on a 2.2 acre property located near Snoqualmie Pass. A Critical Area Study (Wetlands Northwest, 2020) and a Critical Area Designation (CADS20-0269) identified critical areas and buffers that constrained the entire parcel. This report has been prepared to describe proposed project impacts to critical areas and wildlife on or near the property. Included are the location and areas of these impacts, avoidance and minimization measures, and an analysis of the effects of these impacts on critical areas and wildlife, King County code requirements, and proposed compensatory mitigation and monitoring for these impacts.

This report has been prepared to address the requirements of the King County Code (KCC) and was prepared by Teresa Opolka, PWS.

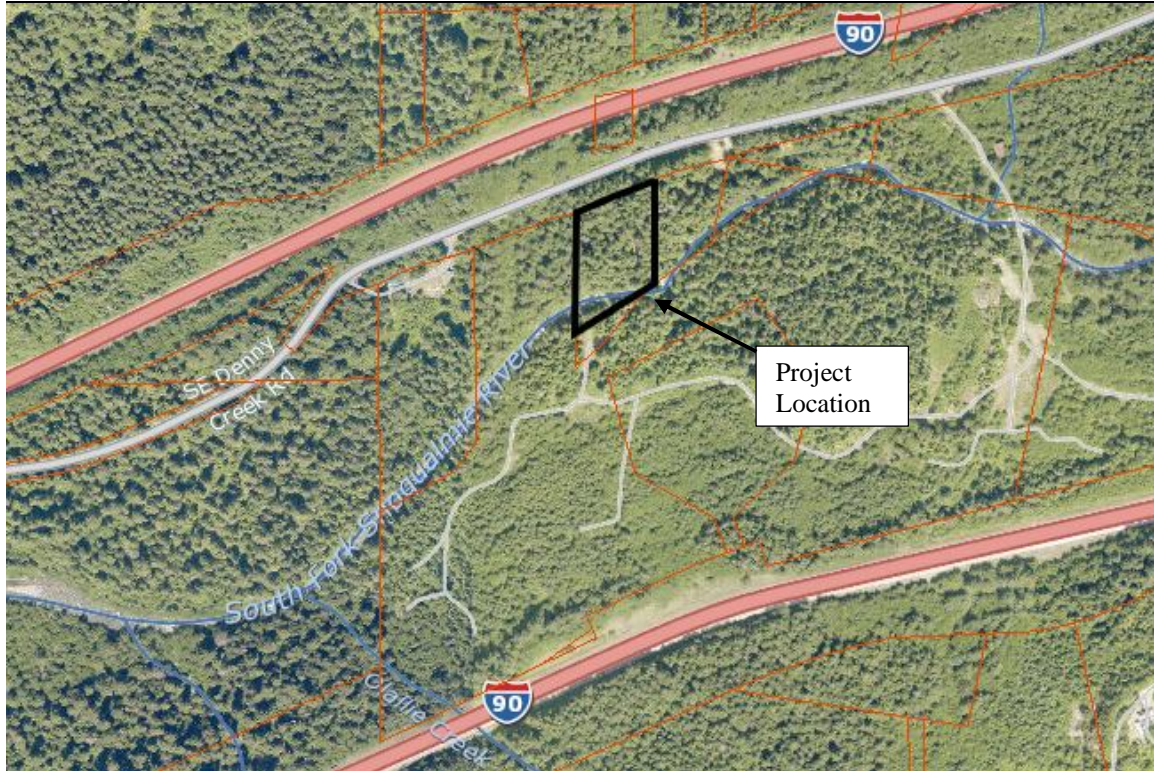
## 2.0 LOCATION and EXISTING CONDITIONS

The property is located south of SE Denny Creek Road west of Snoqualmie Pass, between east and west bound Interstate 90 east of Exit 47. It is in the upper reaches of Water Resource Inventory Area (WRIA) 7, the Snohomish Watershed in the NW1/4 of Section 18, Township 22 North, Range 11 East, W.M.

The property is forested and undeveloped and surrounded by similar properties. The South Fork of the Snoqualmie River flows along the southern edge of the property and the northern property boundary is located adjacent to SE Denny Creek Road.



**Figure 1. Vicinity Map (King County iMAP 2022)**



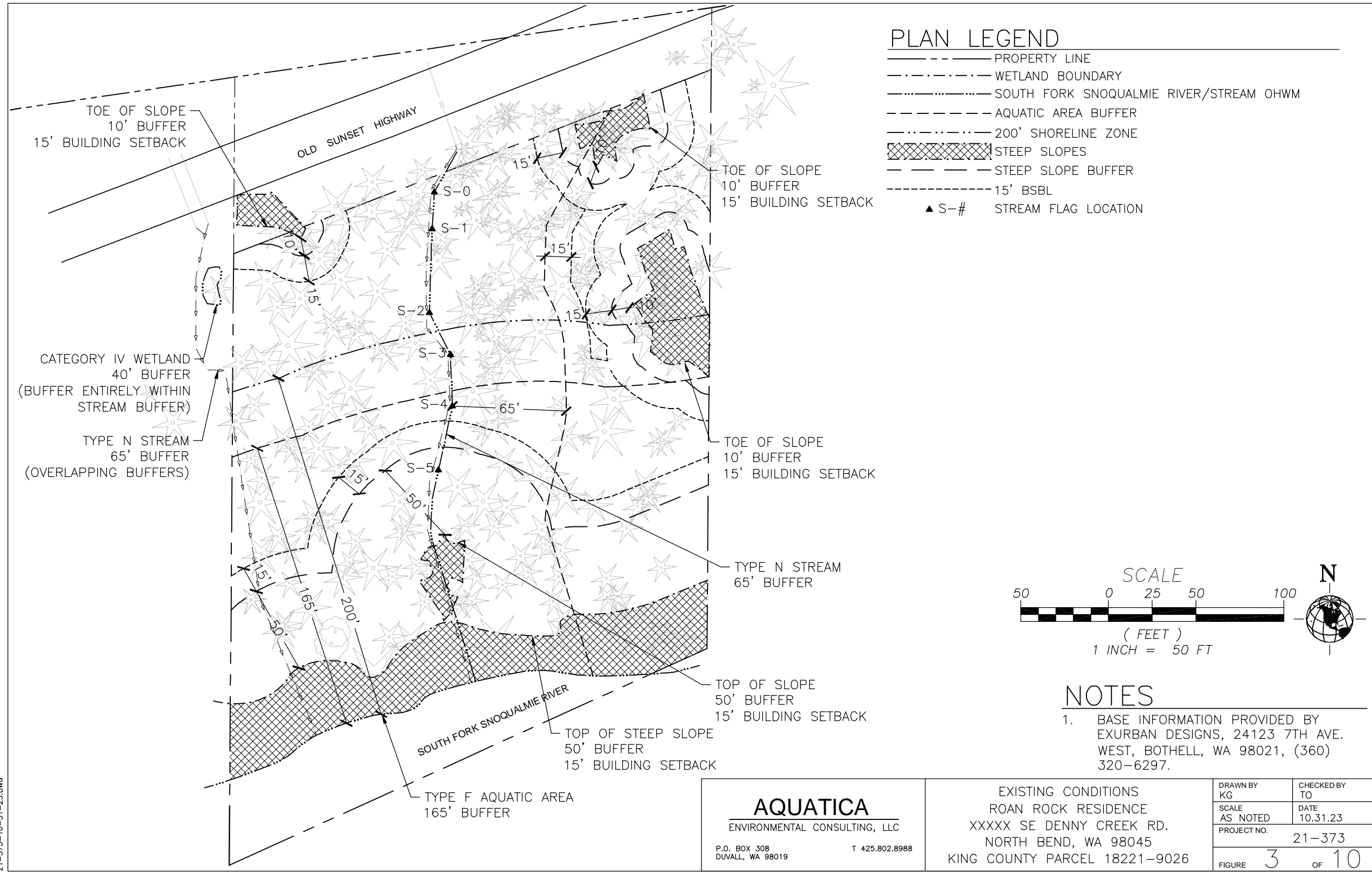
**Figure 2. Aerial Photograph (King County iMAP 2023)**

**3.0 CRITICAL AREAS**

A Critical Areas Designation was previously completed for this parcel as part of CAD22-0269, these features are shown on (Figure 3). Environmental features identified included the South Fork of the Snoqualmie River in the southern part of the property, which is a Type F Aquatic Area and requires a 165-foot buffer and a 15-foot building setback. The South Fork of the Snoqualmie River is also classified as a Shoreline of the State and the majority of the property has a Forestry shoreline designation. Two Type N (non-fish) Aquatic Areas were identified flowing from Denny Creek Road south through the property where they drain into river. These two streams require 65-foot buffers and a 15-foot building setback. An additional Category IV Wetland was identified off-site to the west that requires a 40 foot buffer setback. Steep slopes are present in several areas of the property including above the river and smaller sections of steep slopes adjacent to Denny Creek Road and near the eastern property boundary. Wetlands, streams, the river, steep slopes and their corresponding buffers overlap and constrain almost the entire property. Of the 96,267 sf property, only 2,100 sf is outside of critical areas, buffers and building setbacks in an awkward, narrow area less than fifteen feet wide.

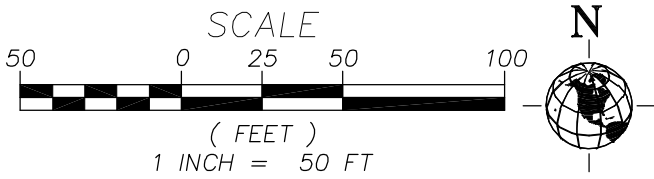
**Table 1 Critical Areas and Property Encumbrances**

Critical Area	Type/Category	Buffer
Unnamed Streams (2)	Ns (non-fsh, seasonal)	65 feet
South Fork Snoqualmie	Type S	165 feet
Wetland A (off-site)	Category IV, PEM	40 feet
Steep Slopes	Regulated, >40%	10 feet
Buffer Building Setback	Structure	15 feet



**PLAN LEGEND**

- PROPERTY LINE
- - - - - WETLAND BOUNDARY
- ..... SOUTH FORK SNOQUALMIE RIVER/STREAM OHWM
- AQUATIC AREA BUFFER
- ..... 200' SHORELINE ZONE
- [Cross-hatched] STEEP SLOPES
- STEEP SLOPE BUFFER
- 15' BSBL
- ▲ S-# STREAM FLAG LOCATION



**NOTES**

1. BASE INFORMATION PROVIDED BY EXURBAN DESIGNS, 24123 7TH AVE. WEST, BOTHELL, WA 98021, (360) 320-6297.

21-373-10-31-23.DWG

**AQUATICA**  
 ENVIRONMENTAL CONSULTING, LLC  
 P.O. BOX 308 DUVALL, WA 98019 T 425.802.8988

EXISTING CONDITIONS  
 ROAN ROCK RESIDENCE  
 XXXXX SE DENNY CREEK RD.  
 NORTH BEND, WA 98045  
 KING COUNTY PARCEL 18221-9026

DRAWN BY KG	CHECKED BY TO
SCALE AS NOTED	DATE 10.31.23
PROJECT NO. 21-373	
FIGURE 3 OF 10	





**Photo 1 Photo of the Eastern Type N Stream**



**Photo 2 South Fork of the Snoqualmie**

#### **4.0 WILDLIFE STUDY**

A wildlife study was conducted for the site. This study evaluated site conditions for habitat and wildlife usage at both the site level and the landscape level to evaluate the potential for wildlife usage. This study documents the vegetation on site with a species list and priority habitat features. A review of the Priority Habitats and Species database was conducted with the department of fish and wildlife to review known sensitive species or habitats that are present in the surrounding sections. Also included is a list of state, federal, and county species of concern or special conservation value which are evaluated for their potential to occur on site

##### **Site Level**

The property is forested with a mid-age conifer-dominated forest with a few alders near the river. Trees are dense and portions of the on-site forest lack a well-developed mid-story (Photo 2). Structural diversity in the tree canopy is lacking as most of the site is an even age stand of trees. The property does have relatively high species diversity of vegetation with a variety of tree species, low shrubs and herbaceous plants. A species list is included in Table 2.

The property likely provides breeding, winter, and/or travel habitat for many species of birds, and mammals such as deer, voles, shrews, bats, mice, squirrels, and coyote. Mountain beaver may use nearby slopes. No eagle or other raptor nests were observed during site visits, but potential nesting sites exist. Species whose breeding requirements could potentially be met on

the site include those nesting on the ground or higher in the canopy; as well as species reliant on a nearby perennial water source; denning and burrowing species; and cavity nesters.

Snags and downed wood are particular features on the site that are attractive to wildlife. Sites with abundant logs and snags contribute positively to the habitat value due to their use by many different species of birds, mammals, amphibians, reptiles, and invertebrates and are listed as a Priority Habitat Feature according to the WDFW PHS list (2023). The highest value of these are the old growth snags and logs on the property as shown Photo 3. Cliffs over 25 feet in height are also a Priority habitat Feature. There is a cliff on-site although according to the geotechnical report this feature does not exceed 20 feet and would not be categorized as a priority feature (Geotech Consultants, 2021), although its cracks and crevices could provide habitat for some species (Photo 4).

Two non-fish streams flow through the site (Photo 1). These convey seasonal runoff down steep to moderate gradient slopes. These features are seasonally wet and have limited areas of still or slow moving water and water may not persist long enough to sustain breeding populations of amphibians. The off-site wetland could potentially have sufficient sustained hydrology to support amphibians although the hydroperiod of this feature was not observed due to its off-site location.

The South Fork of the Snoqualmie River flows through the southern edge (Photo 2) of the property and its adjacent riparian habitat is assumed to provide habitat for many species including mammals, herptiles, and aquatic species. This feature and the relatively undisturbed riparian buffer on-site is valuable for many species including mammals, herptiles, birds, and aquatic species. This river is upstream of Snoqualmie Falls and does not support anadromous salmonids.

Transitional habitat zones between vegetation types create “edge,” which can have both positive and negative impacts on wildlife. Edge habitat on the subject property includes the river edge. Edge habitat generally supports greater wildlife species richness than one block of homogeneous habitat. The edge habitat adjacent to the river likely attracts a variety of species and those reliant on riparian environments as a perennial water source and travel corridor.



**Photo 3 Old Growth Remnant Snags with Woodpecker Activity**



**Photo 4 Small Cliff Near Eastern Property Boundary**

**Table 2 Vegetative Species Identified on the Study Site**

<b>Common name</b>	<b>Scientific name</b>
<i>Trees</i>	
Red alder	<i>Alnus rubra</i>
Western red cedar	<i>Thuja plicata</i>
Douglas-fir	<i>Pseudotsuga menziesii</i>
Western hemlock	<i>Tsuga heterophylla</i>
Grand fir	<i>Abies grandis</i>
<i>Shrubs</i>	
Sitka alder	<i>Alnus rubra</i>
Salmonberry	<i>Rubus spectabilis</i>
Highbush cranberry	<i>Viburnum edule</i>
Salal	<i>Gaultheria shallon</i>
Vine maple	<i>Acer circinatum</i>
Devil's club	<i>Oplopanax horridum</i>
Oval-leaved blueberry	<i>Vaccinium ovalifolium</i>
Red elderberry	<i>Sambucus racemosa</i>
Thimbleberry	<i>Rubus parviflorus</i>
Stink currant	<i>Ribes bracteosum</i>
Sitka mountain-ash	<i>Sorbus sitchensis</i>
<i>Herbaceous/Groundcover Species</i>	
Foam flower	<i>Tiarella trifoliata</i>
Wild ginger	<i>Asarum caudatum</i>
Woodrush	<i>Luzula spp.</i>
Bleeding heart	<i>Dicentra formosa*</i>
foxglove	<i>Digitalis purpurea</i>
Trillium	<i>Trillium ovatum</i>
Star-flowered false solomons seal	<i>Smilacina stellata</i>
Bedstraw	<i>Galium spp.</i>
Clasping twistedstalk	<i>Streptopus amplexifolius</i>
Sword fern	<i>Polystichum munitum</i>
Wood fern	<i>Dryopteris expansa</i>
Bracken fern	<i>Pteridium aquilinum</i>
Deer fern	<i>Blechnum spicant</i>
Oak fern	<i>Gymnocarpium dryopteris</i>
Lady fern	<i>Athyrium filix-femina</i>
Evergreen violet	<i>Viola sempervirens</i>
Twinflower	<i>Linnaea borealis</i>
Vanilla leaf	<i>Achlys triphylla</i>
Bunchberry	<i>Cornus canadensis</i>
Queen's cup	<i>Clintonia uniflora</i>
Trailing blackberry	<i>Rubus ursinus</i>

\*Non-native invasive species

**Landscape Level**

Habitat within and adjacent to the project site should be considered together in qualifying habitat value, as their juxtaposition and interspersions create attributes different from the habitat types alone. This property is in the lower elevations of the cascade mountains at about 2,000 feet in elevation and in proximity to large undeveloped tracts of forest. The most obvious development constraint to wildlife in the area is Interstate 90, which is located north and south of the subject property. This property is part of approximately 625 acres bounded by the east and westbound lanes of I-90, and is surrounded on all sides by the interstate. This area is largely undeveloped, with the exception of Denny Creek Road, a few cabins, and the Denny Creek campground. The westbound lanes about a mile and a half east of the site are elevated, providing connection to undisturbed habitat north of I-90. The I-90 eastbound lanes in this area form a significant wildlife barrier to the south. Although wildlife crossings are now present on I-90 further east, they are not in close proximity. Denny Creek Road is located in varying proximity to the South Fork of the Snoqualmie as it generally follows the river and may deter some species but is not a barrier. Birds in particular could utilize the property and surrounding area with minimal deterrence.

**Federally Protected Species, Priority Species and Species of Significant Conservation Value**

Table 3 includes species that are federally, or state listed and those included in the King County Comprehensive Plan that are designated as species of significant conservation value that are protected through the County’s Critical Areas Ordinance. This table lists these species and addresses their potential to occur in the project area. Omitted are species that occur only in marine habitats, as well as anadromous fish species, as this site is above Snoqualmie Falls which precludes anadromous fish use. Species included on these lists with documented occurrences nearby are discussed in additional detail following the table.

**Table 3 Summary of Listed Wildlife and Species of Concern**

Common name	Scientific name	Potential occurrence	Rational for determination
Trumpeter and Tundra swans	<i>Cygnus buccinator</i> , <i>Cygnus columbianus</i>	Unlikely/no habitat on or near site	Prefers open fields and estuaries, winter use only
Brant	<i>Branta bernicla</i>	Unlikely/no habitat on or near site	Found along Puget Sound shorelines
Surf, White-winged, and Black Scoters	<i>Melanitta spp.</i>	Unlikely/no habitat on or near site	Only found in Washington in winter along coastal areas.
Cinnamon teal	<i>Anas cyanoptera</i>	Unlikely/no habitat on or near site	Diet requires abundant aquatic plants, rare in King County.
Common goldeneye	<i>Bucephala clangula</i>	Unlikely/no habitat on or near site	Prefers larger bodies of water
Barrow’s goldeneye	<i>Bucephala islandica</i>	Unlikely/no habitat on or near site	Found on large ponds, lakes and reservoirs

Common name	Scientific name	Potential occurrence	Rational for determination
Hooded merganser	<i>Lophodytes cucullatus</i>	Unlikely/no habitat on or near site	Prefers small, forested, freshwater wetlands and slow moving water
Wood duck	<i>Aix sponsa</i>	Unlikely/no habitat on or near site	Prefers wooded wetlands
Western grebe	<i>Aechmophorus occidentalis</i>	Unlikely/no habitat on or near site	Prefers coastlines in winter and larger lakes in summer.
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Possible	Possible perching and foraging in river
Peregrine falcon	<i>Falco peregrinus</i>	Unlikely	Prefers to forage in open areas and nest on cliffs or tall structures.
Red-tailed hawk	<i>Buteo jamaicensis</i>	Possible	Possible trees for nesting although lack of open foraging habitat limits the likely use of the site
Merlin	<i>Falco columbarius</i>	Possible	Possible use in winter or migration, prefers more open habitat
Golden Eagle	<i>Aquila chrysaetos</i>	Unlikely	Nests and hunts in more open areas
Northern goshawk	<i>Accipiter gentilis</i>	Possible	Typically found in older forests, WDFW has an old sighting in a nearby section (2003)
Osprey	<i>Pandion haliaetus</i>	Possible	Possible perching and foraging in river
Spotted owl	<i>Strix occidentalis</i>	Possible	Prefers older, more structurally complex forests
Western Screech-Owl	<i>Megascops kennicottii</i>	Likely	Common in streamside forests
Great Blue Heron	<i>Ardea herodias</i>	Unlikely	Prefers slower moving water, no nearby rookeries
American Bittern	<i>Botaurus lentiginosus</i>	Unlikely No Habitat on or near site	Prefers dense marshes
Belted Kingfisher	<i>Megaceryle alcyon</i>	Likely	Perching and foraging opportunities in adjacent river, common along rivers and streams below the mountain hemlock zone
Purple martin	<i>Progne subis</i>	Unlikely No Habitat on or near site	Rare, prefer to nest near salt water
Vaux's swift	<i>Chaetura vauxi</i>	Unlikely No Habitat on or near site	Typically nests in old growth forests, occasionally in chimneys. Possible use during migration
Band-tailed pigeon	<i>Patagioenas fasciata</i>	Likely	Common in low and mid-elevation forests west of the cascades
Harlequin Duck	<i>Histrionicus histrionicus</i>	Unlikely	Prefers turbulent water in fast moving streams although is uncommon below 4,000 feet in elevation in the cascades.
Black-backed woodpecker		Unlikely No Habitat on or near site	Uncommon west of the Cascade crest and prefers burned areas
Hairy woodpecker	<i>Picoides villosus</i>	Foraging evidence observed	Common throughout area; suitable snags and foraging sites observed, possible nesting sites.
Pileated woodpecker	<i>Dryocopus pileatus</i>	Utilizes site. Foraging evidence observed	Prefers large areas of forested habitat. Foraging sites observed.
Western meadowlark	<i>Sturnella neglecta</i>	Unlikely/no habitat on or near site	Requires open grasslands and similar habitats



Common name	Scientific name	Potential occurrence	Rational for determination
Cassin's finch	<i>Haemorhous cassinii</i>	Unlikely/no habitat on or near site	Primarily lives in dry forests east of the cascades. Possible use during migration
Purple finch	<i>Haemorhous purpureus</i>	Possible	Common in western Washington lowlands but prefers habitats with more edge interspersed with open areas
Olive-sided flycatcher	<i>Contopus cooperi</i>	Likely	Common in forest openings in west cascades
Oregon vesper sparrow	<i>Poocetes gramineus affinis</i>	Unlikely/no habitat on or near site	Inhabits dry open areas
Ruffed grouse	<i>Bonasa umbellus</i>	Likely	Common, often in river corridors
Sooty grouse	<i>Dendragapus fuliginosus</i>	Likely	Common in forested foothills in western Washington
Douglas squirrel	<i>Tamiasciurus douglasi</i>	Observed on-site	Common in more intact coniferous forest in Cascades and foothills
Columbian Black-tailed Deer	<i>Odocoileus hemionus columbianus</i>	Likely	Common in a variety of habitats west of the Cascades
Mountain Goat	<i>Oreamnos americanus</i>	Unlikely/no habitat on or near site	Inhabits rugged alpine and subalpine zones
Pika	<i>Ochotona princeps</i>	Unlikely/no habitat on or near site	Inhabits rocky talus slopes above tree line
Marten	<i>Martes americana</i>	Possible	Within the core range for martens, although prefer riparian areas and structurally complex older forests
Mink	<i>Mustela vison</i>	Likely	Common near water in a variety of habitats
Wolverine	<i>Gulo gulo luscus</i>	Unlikely/no habitat on or near site	Found in remote subalpine and alpine zones
Fisher	<i>Pekania pennanti</i>	Possible	Found in conifer and deciduous forest, typically with high structural diversity and habitat features. Rare in Washington however reintroductions have resulted in sightings south of I-90 in the Cascades and south of Highway 2.
Red fox	<i>Vulpes vulpes cascadenis</i>	Unlikely/no habitat on or near site	Found in higher elevation habitats including subalpine and alpine areas
Townsend chipmunk	<i>Tamias townsendii</i>	Likely	Common in diverse habitats in Cascades
Long-legged myotis	<i>Myotis volans</i>	Possible	Possible roosting and foraging opportunities
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Possible foraging	Found in lowland conifer forests, usually in proximity to caves. Roost documented by WDFW in nearby section, however unlikely to roost on-site as species prefers caves, bridges and other open areas.
Long-eared myotis	<i>Myotis evotis</i>	Possible	Prefers older forests with abundant snags, roosting sites unlikely
Pallid bat	<i>Antrozous pallidus</i>	Unlikely	Found in a variety of habitats including cliff faces, although only at low elevations in Washington

Common name	Scientific name	Potential occurrence	Rational for determination
Big Brown Bat	<i>Eptesicus fuscus</i>	Likely	Common in a variety of habitats throughout Washington
Red-legged frog	<i>Rana aurora</i>	Possible	Requires areas of still water for breeding and will utilize adjacent forests
Larch Mountain Salamander	<i>Plethodon larselli</i>	Unlikely/no habitat on or near site	Primarily a subterranean species inhabiting talus and scree slopes
Oregon Spotted Frog	<i>Rana pretiosa</i>	Unlikely/no habitat on or near site	Requires larger wetlands, no known sightings in the west Cascades
Western Toad	<i>Anaxyrus boreas</i>	Possible	Occurs in a variety of habitats, requires areas of still water for breeding and may use adjacent terrestrial forested habitat
Western fence lizard	<i>Sceloporus occidentalis</i>	Unlikely/no habitat on or near site	Prefers coastal areas with driftwood in Puget Sound
Western Pearlshell mussel	<i>Margaritifera falcata</i>	Possible	Inhabits streams with clean, cool faster flowing water and gravel and rock substrates with resident or anadromous salmonids
Oregon and western floater, and western ridge mussel	<i>Annodonta spp., Gonidea angulata</i>	Unlikely	Prefers slower moving clean water and sandy or silty substrates
Blue-gray tail dropper	<i>Prophysaon coeruleum</i>	Possible	Found in moist forests with abundant leaf litter and coarse woody debris
Rainbow Trout	<i>Oncorhynchus mykiss</i>	Likely	Known populations in South Fork of the Snoqualmie River
Pacific clubtail	<i>Phanogomphus kurilis</i>	Unlikely/no habitat on or near site	Found in large ponds and lakes
Beller's Ground Beetle	<i>Agonum belleri</i>	Unlikely/no habitat on or near site	Dependent on sphagnum moss in bogs
Hatch's Click Beetle	<i>Eanus hatchii</i>	Unlikely/no habitat on or near site	Dependent on sphagnum moss in bogs
Western Bumble Bee	<i>Bombus occidentalis</i>	Unlikely/no habitat on or near site	Requires abundant floral resources, known only from remote alpine and subalpine sites in Washington
Johnson's Hairstreak	<i>Callophrys johnsoni</i>	Possible	Requires western dwarf mistletoe which parasitizes western hemlock trees in forests between 100 and 2,500 feet in elevation in western Washington although no known occurrences in King County
Valley Silverspot	<i>Valley Silverspot</i>	Unlikely/no habitat on or near site	Found in native grasslands and montane meadows

### **Priority Species**

The WDFW Priority Habitats and Species database on the web was reviewed for the project and surrounding area. This search included masked data for Gray wolf and spotted owl as well as use by elk. These species are discussed in greater detail below, as well as for pileated

woodpeckers that appear to utilize the property. The publicly available PHS Report is included in Appendix A.

### **Gray Wolf**

The gray wolf is federally listed as endangered in the western two-thirds of Washington State, including the project location. The gray wolf is also state-listed as endangered. The PHS database search indicated masked gray wolf data for the project area, meaning it does not represent an exact location. The most recent sighting near the project area was in 2003 near I-90 (Lee, 2023). The area is not within or near any occupied wolf packs. The Teanaway Pack range was shown as extending to near the Cascade Crest about six miles east of the project area although this territory is not presently known to be occupied (WDFW, 2023).

Suitable gray wolf habitat is largely defined by the presence of prey and isolation from developed areas, although human-wolf interactions have been reported, primarily in the form of hunting or livestock encounters. Because of the likely presence of prey species, especially deer, and the large undeveloped forested tracts that connect this area to known wolf packs in the eastern cascades, the occasional presence of gray wolves cannot not be precluded. However, the project location between the I-90 east and southbound lanes would likely limit the potential frequent use of this site. The proposed limited development of the site near Denny Creek Road with a small cabin is unlikely to impact the potential for use of the area by wolves.

### **Elk**

Resident and winter migratory elk habitat was included for the PHS report for the property. Elk were not observed on the project site and no sign was observed. Calving and migration corridors are included as priority habitats which do not include the project area. Although elk were not observed, they could be present but do not appear to frequently utilize the property. Like other large mammals, the presence of the I-90 corridors around the project area may limit access and likelihood of regular use.

### **Spotted Owl**

Spotted owls are a federally listed threatened species and State listed as endangered. The PHS database has the project area included in a generalized location for spotted owls, *Strix occidentalis*. This is masked data that does not disclose nest locations. KCC 21A.24.382 (H) requires a wildlife habitat conservation area around a 3,700-foot radius from an active nest. The Washington Department of Fish and Wildlife was contacted and confirmed there are no known nests within 3,700 feet of the project (Lee, 2023).

Spotted owls prefer habitat with a closed canopy, multi-layered structurally diverse forests with abundant snags and downed logs. The forest on the subject property has a closed canopy and abundant logs and snags but lacks the multi layered forest structural diversity.

A survey of nests of protected species, including spotted owls, is required prior to clearing as a condition of the building permit if clearing occurs during nesting season, as previously requested by King County.

### **Pileated Woodpecker**

Pileated woodpeckers are a fairly common species in the west Cascades and occur here year-round. Pileated woodpeckers nest in old-growth forest and mature stands, provided large snags are present. The species commonly uses large conifers for drumming and foraging. The study area contains

suitable and numerous foraging and drumming sites. The general young/mid age forest on the site is not preferred nesting habitat for pileated woodpeckers although some large individual trees are present so nesting cannot be ruled out. Foraging signs indicates the use of snags on the site by the species. The required nest survey should also include a survey for pileated nests if clearing during the nesting season. The project will minimize impact to this species by creating snags out of hazard trees whenever safe to do so, at a distance so that the snag will not fall on any structures. Snags that can not be snagged will be toppled in the buffer areas. The project will also be required to relocate snags from the clearing site into the buffers as downed wood, maintaining as much vertical structure as possible.

## 5.0 PROPOSED PROJECT

The applicant is proposing to construct a small cabin near Denny Creek Road (**Figure 4**). A water catchment system beneath the house will be used for water and an on-site septic system is proposed. The property has been used recreationally and access and utilities to the cabin site will be through an existing old road near the northeastern property corner. Although there is an existing dirt road and some disturbance from recreational use, it is not permitted and the County is requiring these areas used for development access be considered a new disturbance.

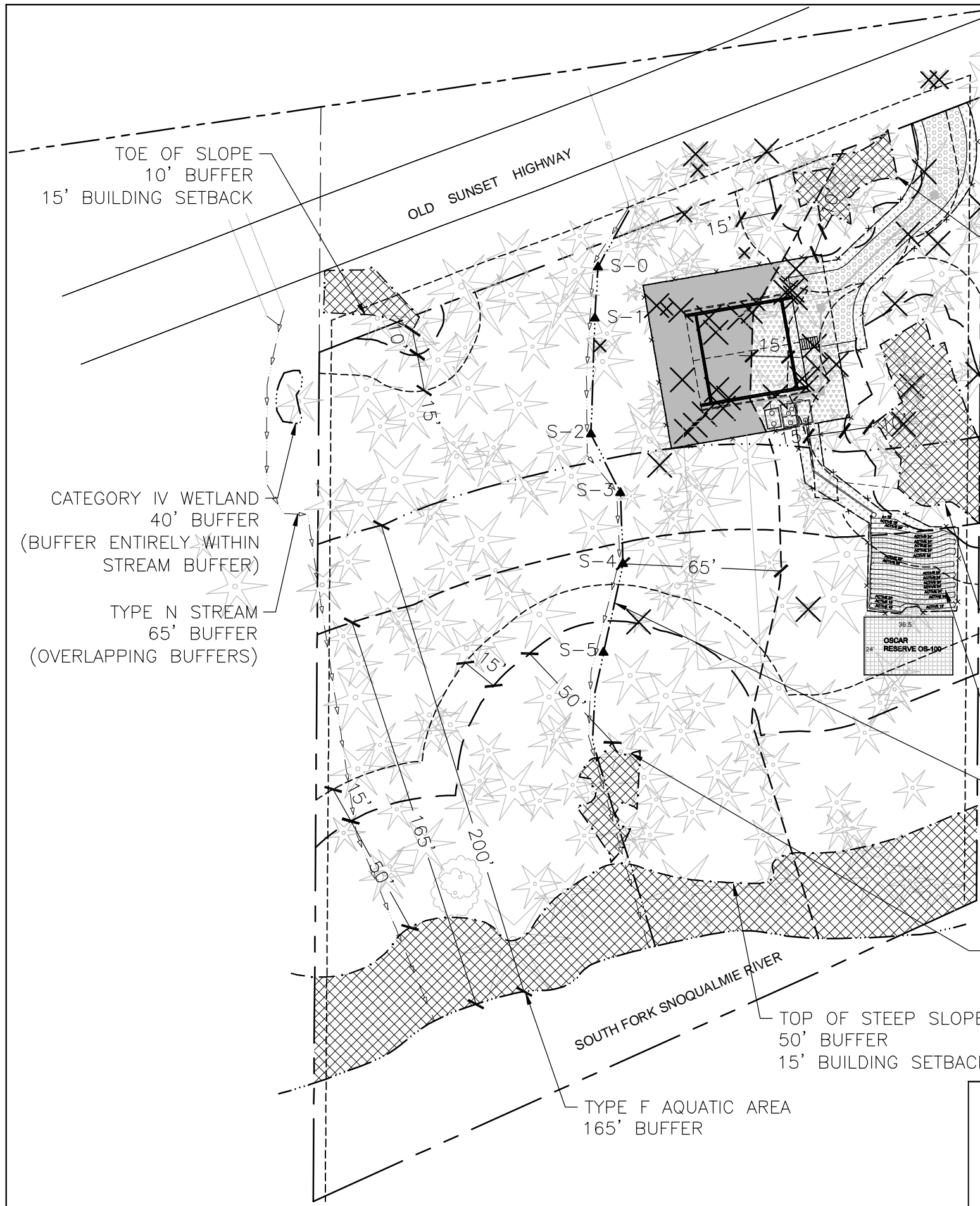
The property has two Type N streams, one Type S stream, steep slopes and an off-site wetland. The property is almost entirely constrained by these features and their buffers. There is nowhere on the property where it is possible to build a small house without impacting buffers and the property will require an alteration exception to allow building partially within the aquatic area buffers. The property will not impact aquatic areas, steep slopes, or wetlands directly. There are no in-water impacts proposed. How environmental sequencing was implemented to avoid and minimize impacts follows, which analyzes how other alternatives were considered and the proposed location determined.

### **Environmental Sequencing, Avoidance and Minimization**

Project impacts were avoided and minimized to the extent feasible, and the project utilized existing areas of disturbance outside of aquatic area buffers as much as possible. However, there was only 2,100 sf of unencumbered property in a narrow strip on the entire property. The proposed cabin location is utilizing a portion of this unencumbered area where it would allow the cabin to be placed as far as possible from other critical areas. The only impact proposed to the aquatic area buffer in the shoreline is for the drainfield which will at least 100 feet from the shoreline and was the only place on the property it could be placed due to the steep slopes and health department setbacks from the streams (100 feet), which exceeds the critical area buffer requirements for the Type N streams. Septic tanks for the drainfield will be placed adjacent to the structure at the minimum setback required to further minimize impacts. The drainfield can be installed without removing trees and without large, heavy equipment to avoid damaging trees. The design of the system allows for the flexibility to avoid tree removal and minimize tree root damage to further minimize buffer impacts. Following installation of the drainfield there will be minimal evidence of the drainfield, and disturbed soil will be restored with native plants to prevent weeds from colonizing the area.

Access is proposed in the northeastern corner of the property, where the road crosses between two steep slope setback areas and is in an area of existing disturbance and entirely outside stream buffers. A more direct route with less site disturbance could occur directly north of the proposed cabin however this would impact aquatic area buffer by both the road and parking area and require the removal of additional trees. Roads are allowed in the 15-foot steep slope building setback, so it was determined this was the location with the lowest impact possible.

The project has demonstrated minimization of Aquatic Area buffer impacts through a geotechnical study to reduce slope buffers, to enable the cabin to be constructed closer to steep slopes and further

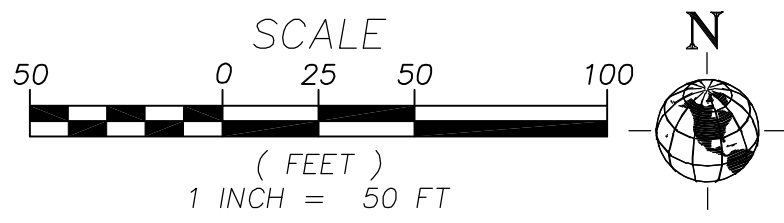


### PLAN LEGEND

- PROPERTY LINE
- - - - - WETLAND BOUNDARY
- ..... SOUTH FORK SNOQUALMIE RIVER/STREAM OHWM
- AQUATIC AREA BUFFER
- ..... 200' SHORELINE ZONE
- [Cross-hatched] STEEP SLOPES
- STEEP SLOPE BUFFER
- 15' BSBL
- ▲ S-# STREAM FLAG LOCATION
- x-x-x- CLEARING LIMITS / SILT FENCE
- ✕ TREES PROPOSED FOR REMOVAL

### IMPACT LEGEND

- [Solid grey] BUFFER IMPACT FOR HOUSE / BSBL - 2,842 SF
  - [Horizontal lines] BUFFER IMPACT FOR DRAINFIELD - 2,155 SF
  - [Vertical lines] DISTURBED AREA OUTSIDE BUFFER FOR HOUSE / BSBL - 2,216 SF
  - [Dotted] DISTURBED AREA OUTSIDE BUFFER FOR DRIVEWAY - 1,334 SF
  - [Diagonal lines] TEMPORARY DISTURBANCE TO BE RESTORED - 1,467 SF
- TREES TO BE REMOVED:  
 HAZARD TREES TO BE REMOVED IN STREAM BUFFER (OUTSIDE CLEARING LIMITS) - 8  
 TREES TO BE REMOVED IN CLEARING LIMITS (HOUSE AND BSBL) IN STREAM BUFFER - 15



### NOTES

1. BASE INFORMATION PROVIDED BY EXURBAN DESIGNS, 24123 7TH AVE. WEST, BOTHELL, WA 98021, (360) 320-6297.

<b>AQUATICA</b> ENVIRONMENTAL CONSULTING, LLC <small>P.O. BOX 308          DUVALL, WA 98019</small>	PROJECT IMPACTS ROAN ROCK RESIDENCE XXXXX SE DENNY CREEK RD. NORTH BEND, WA 98045 KING COUNTY PARCEL 18221-9026		DRAWN BY KG	CHECKED BY TO
			SCALE AS NOTED	DATE 10.31.23
			PROJECT NO. 21-373	
			FIGURE 4	OF 10

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from the Aquatic Areas. Through coordinating with the project Geotech, the minimum slope buffer and building setback has been determined and reduced from the standard fifty foot setback to ten feet plus a fifteen foot building setback. Even with the reduced slope buffers, there is not sufficient room outside of the stream buffers to construct a cabin in the northeastern corner of the site. As a result, the only place to build the cabin is further west of the slopes and partially within the Type N stream buffer. The northwestern corner of the site was ruled out as a potential building location as it would be impacting buffers of two Type N streams within the shoreline zone, a wetland buffer, and it would require crossing a stream to access the drainfield location. Alternatives to the proposed cabin location are described in additional detail below.

### **Alternatives Analysis**

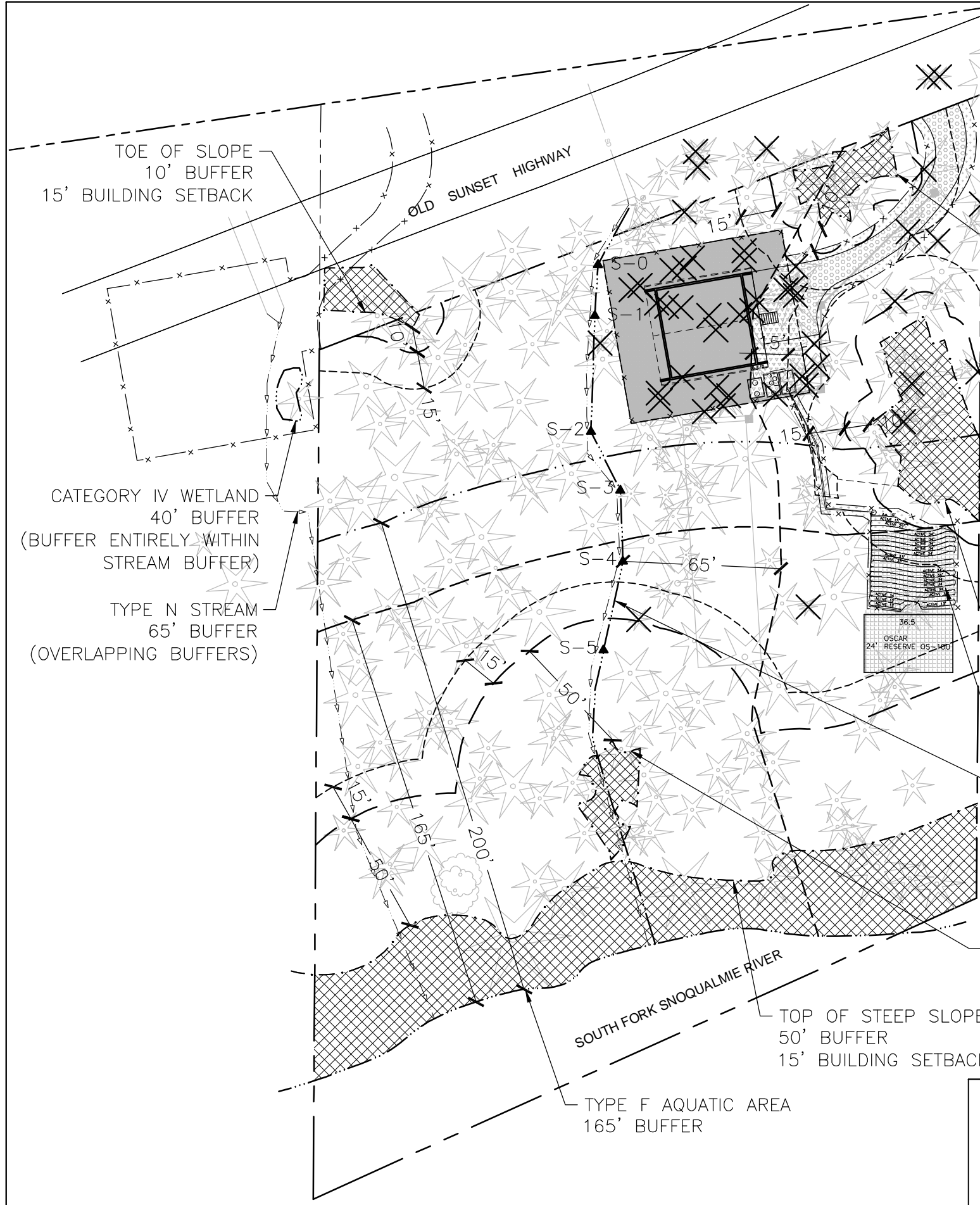
Several cabin locations and designs were evaluated. The first alternative reviewed due to preapplication meeting comments was moving the cabin as close to the road as possible (**Figure 5**). It is not possible to put the cabin in the northeastern corner of the site due to steep slope setbacks. Putting the cabin closer to the road north of the proposed site plan, as shown in Alternative 1 would have resulted in more Aquatic Area buffer impacts, as the stream is located slightly further east as it gets closer to the road and the steep slope building setbacks prevent moving the cabin further east. It also prevented the utilization of the area that is outside of aquatic area buffers. Alternative 1 would have resulted in the cabin closer to the stream with the building setback and clearing limits adjacent to the stream high water mark, more aquatic buffer impact, and more tree removal in aquatic area buffers.

The clients preferred location (Alternative 2) (**Figure 6**), was further south and closer to the shoreline buffer and within the 200-foot shoreline zone. This would have required a longer access road, more overall site disturbance, more aquatic buffer disturbance and more tree removal in aquatic area buffers. Residences are also not allowed in aquatic area buffers in the forestry shoreline designation.

The proposed cabin location sites the structure further away from the road than the property line setbacks could allow as shown in Alternative 1, although this allows the cabin as far away from the Type N stream as possible and using area outside of aquatic area buffer while adhering to the slope structure setback requirements. This location places the structure and building setback outside of the 200 feet shoreline zone and outside of the Type S Shoreline Aquatic Area buffer. The following table summarizes project impacts with these three evaluated site plans which are included as Figures 3 and 4.

**Table 4 Impacts by Project Alternative**

Impact Type	Impacts - Proposed Site Plan and Alternatives		
	Proposed	1	2
Type N Aquatic Buffer	2,842 sf	4,097 sf	3,611sf
Type S Aquatic Buffer (drainfield, impacts temporary)	2,155 sf	2,155 sf	2,155 sf
Temporary Non Buffer	1,467	1,421	1,397 sf
Permanent Non Buffer (Drive and House)	3,550	2,351	3,061 sf
Closest Distance to Type N Stream	17'	0	10'
Trees	23	31	26

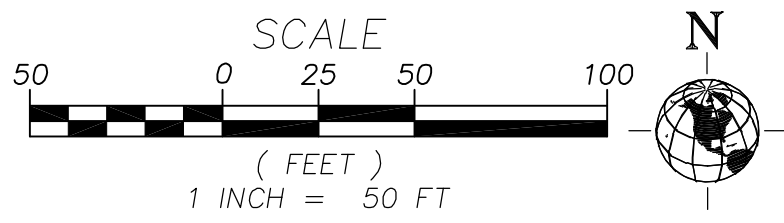


### PLAN LEGEND

- PROPERTY LINE
- - - - - WETLAND BOUNDARY
- ..... SOUTH FORK SNOQUALMIE RIVER/STREAM OHWM
- AQUATIC AREA BUFFER
- ..... 200' SHORELINE ZONE
- [Cross-hatched] STEEP SLOPES
- STEEP SLOPE BUFFER
- 15' BSBL
- ▲ S-# STREAM FLAG LOCATION
- x-x-x-x- CLEARING LIMITS / SILT FENCE
- ✕ TREES PROPOSED FOR REMOVAL

### IMPACT LEGEND

- [Solid grey] BUFFER IMPACT FOR HOUSE / BSBL - 4,097 SF
  - [Horizontal lines] BUFFER IMPACT FOR DRAINFIELD - 2,155 SF
  - [Dotted] DISTURBED AREA OUTSIDE BUFFER FOR HOUSE / BSBL - 961 SF
  - [Vertical lines] DISTURBED AREA OUTSIDE BUFFER FOR DRIVEWAY - 1,390 SF
  - [Diagonal lines] TEMPORARY DISTURBANCE TO BE RESTORED - 1,421 SF
- TREES TO BE REMOVED:  
 HAZARD TREES TO BE REMOVED IN STREAM BUFFER (OUTSIDE CLEARING LIMITS) - 6  
 TREES TO BE REMOVED IN CLEARING LIMITS (HOUSE AND BSBL) IN STREAM BUFFER - 25

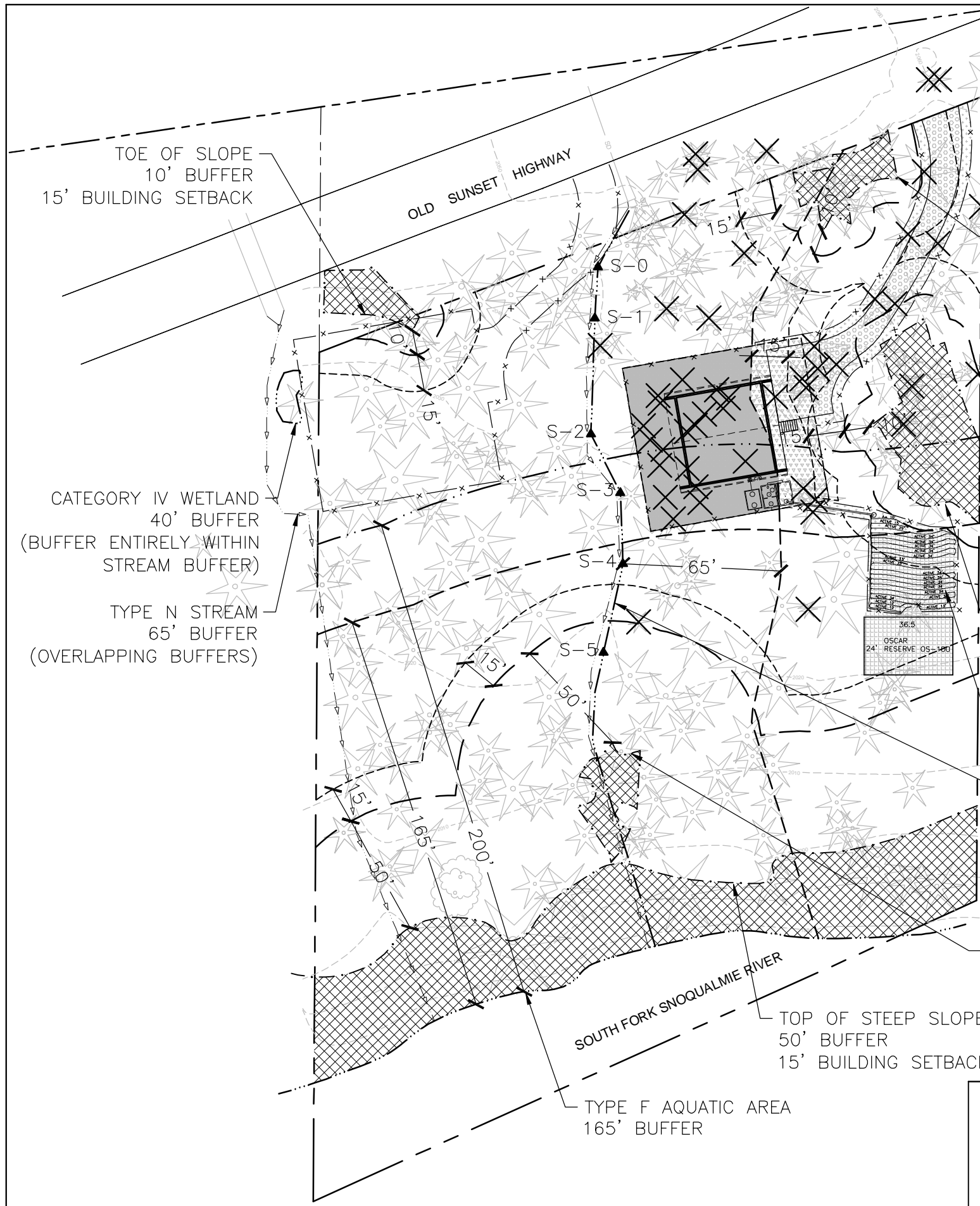


### NOTES

1. BASE INFORMATION PROVIDED BY EXURBAN DESIGNS, 24123 7TH AVE. WEST, BOTHELL, WA 98021, (360) 320-6297.

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<b>AQUATICA</b> ENVIRONMENTAL CONSULTING, LLC <small>P.O. BOX 308          DUVALL, WA 98019</small>	PROJECT IMPACTS - ALTERNATIVE 1		DRAWN BY KG	CHECKED BY TO
	ROAN ROCK RESIDENCE		SCALE AS NOTED	DATE 10.31.23
	XXXXX SE DENNY CREEK RD. NORTH BEND, WA 98045		PROJECT NO. 21-373	
	KING COUNTY PARCEL 18221-9026		FIGURE <b>5</b> OF <b>10</b>	

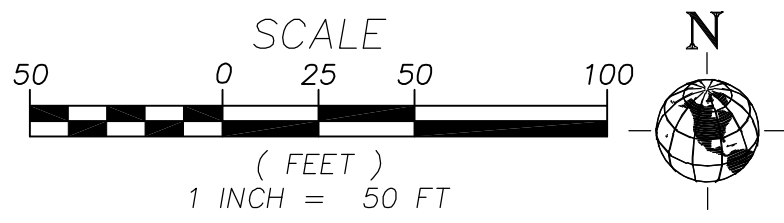


### PLAN LEGEND

- PROPERTY LINE
- - - - - WETLAND BOUNDARY
- SOUTH FORK SNOQUALMIE RIVER/STREAM OHWM
- AQUATIC AREA BUFFER
- 200' SHORELINE ZONE
- XXXXX STEEP SLOPES
- STEEP SLOPE BUFFER
- 15' BSBL
- ▲ S-# STREAM FLAG LOCATION
- x-x-x-x- CLEARING LIMITS / SILT FENCE
- X TREES PROPOSED FOR REMOVAL

### IMPACT LEGEND

- [Solid Grey Box] BUFFER IMPACT FOR HOUSE / BSBL - 3,611 SF
  - [Horizontal Line Box] BUFFER IMPACT FOR DRAINFIELD - 2,155 SF
  - [Dotted Box] DISTURBED AREA OUTSIDE BUFFER FOR HOUSE / BSBL - 1,447 SF
  - [Vertical Line Box] DISTURBED AREA OUTSIDE BUFFER FOR DRIVEWAY - 1,614 SF
  - [Cross-hatch Box] TEMPORARY DISTURBANCE TO BE RESTORED - 1,397 SF
- TREES TO BE REMOVED:  
 HAZARD TREES TO BE REMOVED IN STREAM BUFFER (OUTSIDE CLEARING LIMITS) - 9  
 TREES TO BE REMOVED IN CLEARING LIMITS (HOUSE AND BSBL) IN STREAM BUFFER - 17



### NOTES

1. BASE INFORMATION PROVIDED BY EXURBAN DESIGNS, 24123 7TH AVE. WEST, BOTHELL, WA 98021, (360) 320-6297.

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<b>AQUATICA</b> ENVIRONMENTAL CONSULTING, LLC <small>P.O. BOX 308          DUVALL, WA 98019      T 425.802.8988</small>	PROJECT IMPACTS - ALTERNATIVE 2 ROAN ROCK RESIDENCE XXXXX SE DENNY CREEK RD. NORTH BEND, WA 98045 KING COUNTY PARCEL 18221-9026		DRAWN BY KG	CHECKED BY TO
			SCALE AS NOTED	DATE 10.31.23
			PROJECT NO. 21-373	
		FIGURE <b>6</b> OF <b>10</b>		



**King County Critical Area Code Requirements****Critical Areas Alteration Exception (KCC 21A.24.070.A.3)****a. There is no feasible alternative to the development proposal with less adverse impact on the critical area;**

*This requirement has been met and was detailed in the previous sections with the avoidance and minimization and alternatives analysis. The proposed location, as summarized in Table 4 has the least number of trees removed, the greatest distance from the stream, and the least amount of stream buffer impact.*

**b. The alteration is the minimum necessary to accommodate the development proposal;**

*The project has been designed to avoid and minimize aquatic buffer impacts to the greatest extent possible, the proposal represents a site planning process that represents the most feasible alternative with the least adverse impacts on the critical area. Numerous site plans were evaluated and several factors were evaluated including 1) the type of Aquatic Area buffer impacted, 2) distance to the Aquatic Area, 3) area impacted and 4) trees impacted.*

**c. The approval does not require the modification of a critical area development standard established by this chapter;**

*A development standard will not be modified, these are individually addressed in the following section.*

**d. The development proposal does not pose an unreasonable threat to the public health, safety or welfare on or off the development proposal site and is consistent with the general purposes of this chapter and the public interest;**

*This development proposal does not pose a threat to the public health, safety or welfare. The King County Department of Public Health has approved the on-site septic system, which meets requirements to protect the adjacent aquatic resources from contamination. The proposed cabin is on private property and will conform to all building code requirements.*

**e. For dwelling units, no more than 5,000 square feet or 10% of the site, whichever is greater, may be disturbed by structures, building setbacks, or other land alterations, including grading, utility installations and landscaping, not including the driveway or and onsite septic;**

*Ten percent of the 96,267 square foot site is 9,626 square feet. The project is proposing to impact 5,058 sf for the cabin and building setback, well below the maximum allowed.*

**f. To the maximum extent practical, access is located to have the least adverse impact on the critical area and critical area buffer;**

*Access is located in an existing area of disturbance and outside of the aquatic area buffers. The driveway access is located between the steep slopes in the northeastern corner of the site. This area is already disturbed and in an area where there is insufficient room for the cabin due to steep slope building setbacks, however the driveway is allowed in the steep slope building setback which allowed the proposal to focus the development activities in existing disturbed areas but minimize aquatic area buffer impacts for access to the greatest extent practical.*

**g. The critical area is not used as a salmonid spawning area.**

*There are no anadromous fish in this area, as it is upstream of Snoqualmie Falls. The project has no direct aquatic area impacts.*

### **Development Standards**

The KCC 21A.24.365 requires development standards for sites that apply to development proposals and alterations on sites containing aquatic areas or their buffers. These King County Standards follow in bold text, with how the project will meet these requirements in italicized text.

- A. Unless allowed as an alteration exception under K.C.C. 21A.24.070, only the alterations identified in K.C.C. 21A.24.045 are allowed in aquatic areas and aquatic area buffers;**

*Project impacts are allowed as an alteration exception under KCC 21A.24.070.*

- B. Grading for allowed alterations in aquatic area buffers is only allowed from May 1 to October 1. This period may be modified when the department determines it is necessary along marine shorelines to protect critical forage fish and salmonid migration or as provided in K.C.C. 16.82.095;**

*The project will adhere to the above seasonal grading restrictions.*

- C. The moisture-holding capacity of the topsoil layer on all areas of the site not covered by impervious surfaces should be maintained by:**

- 1. Minimizing soil compaction, or**
- 2. Reestablishing natural soil structure and the capacity to infiltrate;**

*There will be no heavy equipment used in the aquatic area buffer except to grade the driveway, proposed cabin and building setback area. Areas outside of temporary and permanent impacts will be protected by construction fencing. Areas to be cleared will have the topsoil layer retained and stockpiled to restore temporarily disturbed areas.*

- D. New structures within an aquatic area buffer should be sited to avoid the creation of future hazard trees and to minimize the impact on groundwater movement; and**

*The new structure will be built near trees to be retained. All measures required in the arborist report (Davey Tree, 2023) will be implemented to protect retained trees. New structures are not anticipated to impact groundwater movement which is not known to be an issue in the building location.*

- E. To the maximum extent practical:**

- 1. The soil duff layer should not be disturbed, but if disturbed, should be redistributed to other areas of the project site where feasible;**

*This is addressed in Items C 1-2*

- 2. A spatial connection should be provided between vegetation within and outside the aquatic area buffer to prevent creation of wind throw hazards; and**

*Wind throw hazards are addressed in the Tree Study. The area proposed for development is surrounded by forest and small, relatively narrow areas are proposed to be cleared to minimize windthrow and maintain spatial connections.*

- 3. Hazard trees should be retained in aquatic area buffers and either topped or pushed over toward the aquatic area;**

*Hazard trees in the buffer will be topped if safe to do so at a distance to prevent damage to structures. If hazard trees cannot be topped safely it will be toppled into buffers.*

## **Shorelines**

The parcel is located within the shoreline jurisdiction of the South Fork of the Snoqualmie River and is designated a Forestry Shoreline. The shoreline jurisdiction extends 200 feet from the river and includes contributing tributaries within 200 feet of the mainstem, which includes a portion of the Type N streams on the property. Projects impacting shorelines must achieve no net loss of ecological functions in the shoreline, and a mitigation plan follows to address this requirement. The Impact Analysis further analyzes the functions impacted.

Single family residential uses are a conditional use in the forestry shoreline designation per 21A.25.200(B)(22), which requires a shoreline conditional use permit. Per this code section, single detached dwelling units are required to be located outside of the aquatic area buffer and set back from the ordinary high water mark to the maximum extent practical. The proposed cabin is located outside of the 200' shoreline aquatic area buffers, but is within the buffer of the Type N stream where it is just beyond the shoreline jurisdiction. The only location on the property where a drainfield can be located is 100 feet from the Type S aquatic area buffer. This proposed location will require the project to obtain a variance for relief for from this requirement.

RCW 90.58.020 exists to allow coordinated planning of permitted, prioritized uses that minimize damage to the ecology and environment of the shoreline area and public's use of the water.

Low-Density, Single-Family developments that preserve the natural character of the shoreline, result in a long-term benefit, and protect the resources and ecology of the shorelines are prioritized uses, while recognizing and protecting private property rights consistent with the public interest. The public interest, including the opportunity to enjoy the physical and aesthetic qualities of the natural shoreline, and the control of pollution and prevention of damage to the natural environment, shall be of primary importance while fostering all reasonable and appropriate developments.

The proposed single-family residence is within the category of prioritized uses along the state's shorelines, and the decision to allow reasonable and appropriate development thereof is respecting of private property rights. While the public use of a private property is not provided on the subject site or implied as required by the policy, the protection and enhancement of the shoreline environment benefits the public as a whole directly and indirectly, and helps preserve the network of natural features that notably characterize the neighborhood, region, and State.

## **Shoreline Conditional Use**

KCC 21A.44.100 allows for conditional use of shorelines when the review criteria in WAC 173-27-160 have been met, which is addressed below. Single family residential uses are an allowed use in the forestry zone, and the residence itself will be located outside of aquatic area buffers. Extraordinary circumstances due to the extensive buffers and streams will preclude reasonable use of the property in a manner consistent with the use regulations of the K.C.C. Chapter 21A.25. As detailed in the Environmental Sequencing section, there is no other place on the property for the on-site septic system drainfield except in the outer portion of the Aquatic Area Buffer. Reasonable use of the property would be denied without this allowance. The WAC 173-27-160 review criteria

for conditional use permits follows in bold text with how the project will meet them in italicized text.

## **WAC 173-27-160**

**(1) Uses which are classified or set forth in the applicable master program as conditional uses may be authorized provided that the applicant demonstrates all of the following:**

**(a) That the proposed use is consistent with the policies of RCW 90.58.020 and the master program;**

### **RCW 90.58.020**

- (1) Recognize and protect the statewide interest over local interest;
- (2) Preserve the natural character of the shoreline;
- (3) Result in long term over short term benefit;
- (4) Protect the resources and ecology of the shoreline;
- (5) Increase public access to publicly owned areas of the shorelines;
- (6) Increase recreational opportunities for the public in the shoreline;
- (7) Provide for any other element as defined in RCW **90.58.100** deemed appropriate or necessary.

*The proposed project will not be inconsistent with the policies of RCW 90.58.020, which are included above. There is no statewide interest that the proposed drainfield in the aquatic area buffer will be adversely impacting. This system will be installed in a low impact manner will little impact to the natural vegetation thus preserving the natural character of the shoreline. Flexibility in the drainfield lines is possible to prevent tree removal and root damage. The long term benefit to the aquatic resource of an intact forested buffer will remain in this area, thus protecting the resources and ecology of the shoreline. This is not a publicly owned parcel and there will be no change to public access or use as a result of this project. No other elements of RCW 90.58.100 are applicable to the project that have not been addressed by the mitigation plan and project design.*

**(b) That the proposed use will not interfere with the normal public use of public shorelines;**

*There is currently no public use of the shoreline from this property and this will not change as a result of this project.*

**(c) That the proposed use of the site and design of the project is compatible with other authorized uses within the area and with uses planned for the area under the comprehensive plan and shoreline master program;**

*The proposed use and design of the proposed cabin location is similar and compatible with other single family homes on lots to the east and west. There are no known incompatible uses planned for the area.*

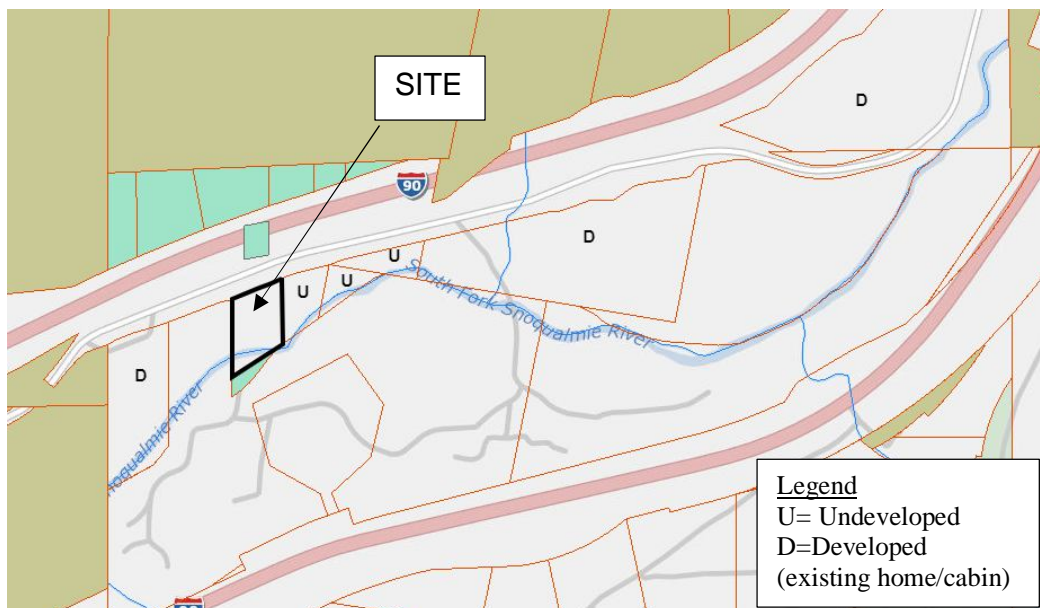
**(d) That the proposed use will cause no significant adverse effects to the shoreline environment in which it is to be located; and**

*The only impact to the shoreline environment will be a drainfield installed with low impact techniques that should not require the removal of trees or cause any other impacts that would be adverse to the shoreline environment. The health department has approved the design which meets all health and safety requirements and minimum distances from streams. The health department has determined what minimum distance from water is necessary and the project meets these requirements.*

**(e) That the public interest suffers no substantial detrimental effect.**

*The project will not have a detrimental effect to the public interest. No impacts to water quality, recreation, or aesthetics to the shoreline are anticipated.*

**(2) In the granting of all conditional use permits, consideration shall be given to the cumulative impact of additional requests for like actions in the area. For example, if conditional use permits were granted for other developments in the area where similar circumstances exist, the total of the conditional uses shall also remain consistent with the policies of RCW 90.58.020 and shall not produce substantial adverse effects to the shoreline environment.** *This situation is somewhat unique, in that the surrounding area is a private inholding surrounded by thousands of acres of public land that extend generally from east of North Bend to the headwaters of the South Fork of the Snoqualmie. There are 11 privately owned parcels along the river in this area of private land. Of these 11 properties three are already developed with a house or cabin and are unlikely to need a conditional use permit. Four of the parcels are large parcels between 17 and 77 acres in size and are also unlikely to need a conditional use permit due to their large size which would allow the flexibility to site project improvements out of the shoreline zone. This leaves four small constrained parcels, including the subject of this report, that could potentially be constrained enough to request a similar permit. Two of the remaining parcels are under the same ownership and unlikely to be developable individually and the remaining parcels do not appear to be additionally constrained by additional small streams flowing through the parcel. It is unlikely that they would also be in this situation. However, if one of them did have a similar situation there are approximately seventeen river miles between the crest and North Bend and the situation this parcel and the adjoining ones are in are unique, uncommon, and a similar allowance for a low impact drainfield design with mitigation would not cumulatively be inconsistent with the policies of RCW90.58.020 or result in substantial adverse cumulative impacts.*



**(3) Other uses which are not classified or set forth in the applicable master program may be authorized as conditional uses provided the applicant can demonstrate consistency with the requirements of this section and the requirements for conditional uses contained in the master program.**

*Not applicable*

**(4) Uses which are specifically prohibited by the master program may not be authorized pursuant to either subsection (1) or (2) of this section.**

*Residential uses are not specifically prohibited by the master program.*

### **Shoreline Variance**

*The placement of the drainfield in an aquatic area buffer in a forestry shoreline will require a variance. The KCC Section 21A.44.090, below in bold text details the items that must be met to obtain a shoreline variance.*

**A. A shoreline variance shall be granted by the county from the bulk, dimensional or performance standards set forth in K.C.C. 21A.25.220 only if the applicant demonstrates that:**

**1. The review criteria of WAC 173-27-170 have been met;**

*These criteria are addressed in the following section.*

**2. The shoreline variance does not permit a use that is specifically prohibited in the environmental designation; and**

*Residential uses are not specifically prohibited in a forestry shoreline designation.*

**3. Views from nearby roads and public areas are protected.**

*The project will leave the trees between the cabin and the road. This is an approximately fifty foot strip vegetated with tall trees as well as a dense midstory which will provide excellent screening of the cabin from the road.*

### **Review criteria for variance permits WAC 173-27-170**

The purpose of a variance permit is strictly limited to granting relief from specific bulk, dimensional or performance standards set forth in the applicable master program where there are extraordinary circumstances relating to the physical character or configuration of property such that the strict implementation of the master program will impose unnecessary hardships on the applicant or thwart the policies set forth in RCW 90.58.020.

**(1) Variance permits should be granted in circumstances where denial of the permit would result in a thwarting of the policy enumerated in RCW 90.58.020. In all instances the applicant must demonstrate that extraordinary circumstances shall be shown and the public interest shall suffer no substantial detrimental effect.**

*RCW90.58.020 are addressed in the conditional use permit section, and it is detailed how the variance is required for reasonable use of the property and will not thwart 90.58.020.*

**(2) Variance permits for development and/or uses that will be located landward of the ordinary high water mark (OHWM), as defined in RCW 90.58.030 (2)(c), and/or landward of any wetland as defined in RCW 90.58.030 (2)(h), may be authorized provided the applicant can demonstrate all of the following:**

**(a) That the strict application of the bulk, dimensional or performance standards set forth in the applicable master program precludes, or significantly interferes with, reasonable use of the property;**

*Reasonable use of the property would be prohibited if a variance to allow the drainfield in the outer part of the aquatic area buffer were to be denied. There is no other location on the*

*property that meets health department requirements, which is detailed in the Environmental Sequencing section of this report.*

**(b) That the hardship described in (a) of this subsection is specifically related to the property, and is the result of unique conditions such as irregular lot shape, size, or natural features and the application of the master program, and not, for example, from deed restrictions or the applicant's own actions;**

*This property is constrained by a river that flows adjacent to the southern property boundary and two streams that flow through the property parallel to the east and west property boundaries. These features combined with the steep slopes prevent any other location for a drainfield. The presence of the critical areas are not caused by the applicant's own actions.*

**(c) That the design of the project is compatible with other authorized uses within the area and with uses planned for the area under the comprehensive plan and shoreline master program and will not cause adverse impacts to the shoreline environment;**

*The proposed use and design of the proposed cabin location is similar and compatible with other single family homes on lots to the east and west. There are no known incompatible uses planned for the area.*

**(d) That the variance will not constitute a grant of special privilege not enjoyed by the other properties in the area;**

*The variance would not grant special privileges not enjoyed by other properties. As noted in the cumulative effects section in the prior section, the majority of adjacent properties are larger, less constrained, and already developed and do not need this variance. There is very little possibility for cumulative impacts for a similar use by other projects on the South Fork of the Snoqualmie.*

**(e) That the variance requested is the minimum necessary to afford relief; and**  
*The area for which the variance is requested is the minimum necessary for a drainfield.*

**(f) That the public interest will suffer no substantial detrimental effect.**  
*The project will not have a detrimental effect to the public interest. No impacts to water quality, recreation, or aesthetics to the shoreline are anticipated.*

**(3) Variance permits for development and/or uses that will be located waterward of the ordinary high water mark (OHWM), as defined in RCW 90.58.030 (2)(c), or within any wetland as defined in RCW 90.58.030 (2)(h), may be authorized provided the applicant can demonstrate all of the following:**

**(a) That the strict application of the bulk, dimensional or performance standards set forth in the applicable master program precludes all reasonable use of the property;**

**(b) That the proposal is consistent with the criteria established under subsection (2)(b) through (f) of this section; and**

**(c) That the public rights of navigation and use of the shorelines will not be adversely affected.**

*Not applicable. No work in wetlands or waterward of the OHWM is proposed.*

**(4) In the granting of all variance permits, consideration shall be given to the cumulative impact of additional requests for like actions in the area. For example if variances were granted to other developments and/or uses in the area where similar circumstances exist the total of the variances shall also remain consistent with the policies**

**of RCW 90.58.020 and shall not cause substantial adverse effects to the shoreline environment.**

*This situation is somewhat unique, in that the surrounding area is a private inholding surrounded by thousands of acres of public land. There are 11 privately owned parcels along the river. Of these 11 properties three are already developed are unlikely to need a conditional use permit. Four of the parcels are large parcels between 17 and 77 acres in size and are also unlikely to need a conditional use permit due to their large size likely allows the flexibility to site project improvements out of the shoreline zone. This leaves four small constrained parcels, including the subject of this report, that could potentially be constrained enough to request a similar permit. There are approximately seventeen river miles between the crest and northbend and the situation this parcel and the adjoining ones are in are unique, uncommon, and a similar allowance for a low impact drainfield design with mitigation would not cumulatively be inconsistent with the policies of RCW90.58.020.*

- (5) Variances from the use regulations of the master program are prohibited.  
*Not applicable*

**6.0 ON-SITE MITIGATION**

Mitigation is proposed through a combination of on-site buffer enhancement, buffer replacement, and off-site through use of the Snohomish Basin Mitigation Bank. The on-site mitigation section is included in this section to address hazard tree mitigation, temporary project impacts/restoration of previously disturbed areas. **Figure 7** visually depicts the mitigation described below and is further summarized in Table 6 located in a following section. The majority of permanently impacted buffer areas will be mitigated at the Snohomish Basin Mitigation Bank.

**Hazard Tree Mitigation**

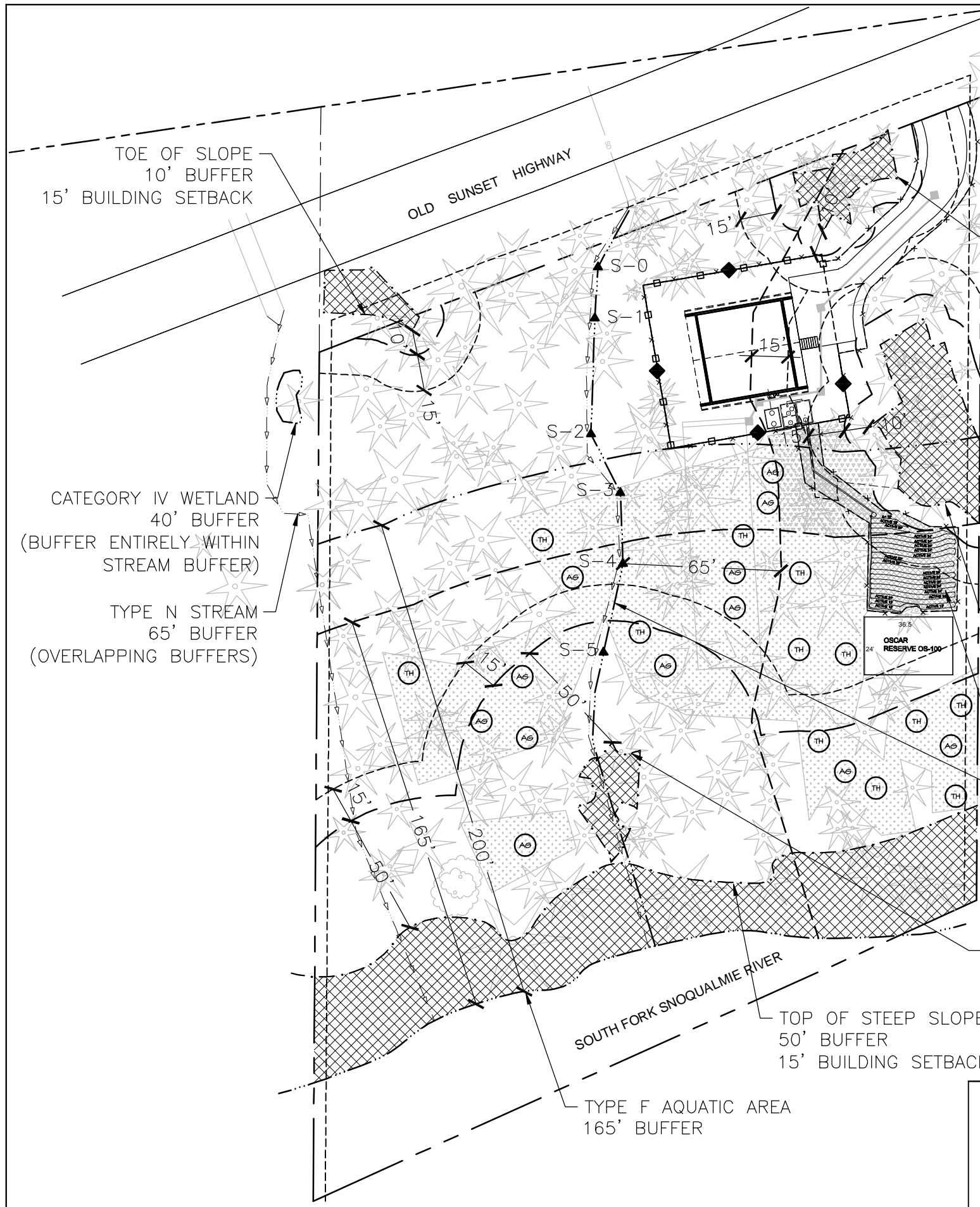
The project proposes to mitigate for hazard tree removal in the buffer by planting shade tolerant replacement trees at a 3:1 ratio (per County requirements) in the aquatic area buffer south of the cabin according to the following table. The area north and west of the proposed cabin location is vegetated with native vegetation with a well developed groundcover, midstory, and canopy and does not need enhancement (Photo 5 Typical Forest and On-Site Buffer Conditions North and West of the Proposed CabinPhoto 5). Existing vegetation is native, diverse, and provides adequate screening from both the road and the adjacent Type N stream. The buffer area south of the proposed cabin (Photo 6) is also vegetated with native vegetation but is an even age stand that lacks a mid-story resulting in a lack of adequate screening and low structural diversity. This area has few young trees in the understory and is an appropriate location to plant shade tolerant trees to increase the future screening and structural diversity of the buffer.

**Table 5 Summary of Tree Removal\***

Hazard Tree Removal in Buffer	Proposed Replacement Trees
8	24

\*This table includes hazard trees removed in the Aquatic Area Buffers.





### PLAN LEGEND

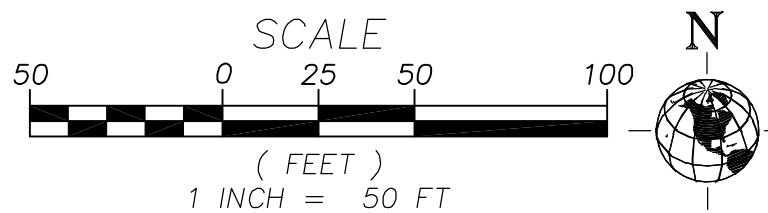
- PROPERTY LINE
- - - - - WETLAND BOUNDARY
- SOUTH FORK SNOQUALMIE RIVER/STREAM OHWM
- AQUATIC AREA BUFFER
- 200' SHORELINE ZONE
- [Cross-hatched] STEEP SLOPES
- STEEP SLOPE BUFFER
- 15' BSBL
- ▲ S-# STREAM FLAG LOCATION
- x-x-x-x- CLEARING LIMITS / SILT FENCE
- ◆-□ SPLIT-RAIL FENCE WITH SIGNS

### MITIGATION LEGEND

- [Dotted pattern] AQUATIC AREA BUFFER REPLACEMENT WITH RESTORATION AND ENHANCEMENT - 1,669 SF
  - [Cross-hatched] BUFFER RESTORATION - 1,833 SF
  - [Stippled] TREE REPLACEMENT AREA - 19,162 SF
- BUFFER IMPACT FOR HOUSE AND BSBL OF 2,842 SF TO BE MITIGATED AT SNOHOMISH BASIN MITIGATION BANK. TEMPORARY DISTURBANCE TO BE RESTORED.

### PLANT LIST (SEE FIGURE 6 FOR SCHEDULE)

KEY	SCIENTIFIC NAME	COMMON NAME
AG	ABIES GRANDIS	GRAND FIR
TH	TSUGA HETEROPHYLLA	WESTERN HEMLOCK



### NOTES

1. BASE INFORMATION PROVIDED BY EXURBAN DESIGNS, 24123 7TH AVE. WEST, BOTHELL, WA 98021, (360) 320-6297.

21-373-10-31-23.DWG

<b>AQUATICA</b> ENVIRONMENTAL CONSULTING, LLC <small>P.O. BOX 308          DUVALL, WA 98019</small>	MITIGATION PLAN ROAN ROCK RESIDENCE XXXXX SE DENNY CREEK RD. NORTH BEND, WA 98045 KING COUNTY PARCEL 18221-9026	DRAWN BY KG	CHECKED BY TO
		SCALE AS NOTED	DATE 10.31.23
PROJECT NO. 21-373		FIGURE 7 OF 10	



Photo 5 Typical Forest and On-Site Buffer Conditions North and West of the Proposed Cabin



Photo 6 Typical Forest and On-Site Buffer Conditions South of the Proposed Cabin. This area is proposed to be enhanced with shade tolerant confirs to increase structural diversity and screening.



**Photo 7 View of the Proposed Cabin Location**



**Photo 8 View of Existing Disturbed Driveway Area**



**Photo 9 View of Proposed Drainfield Area**

### **Temporary Impacts**

Mitigation for temporary impacts will be restored at a 1:1 ratio with native plants. Trees will not be removed from these areas and impacted vegetated includes groundcover species and these species are proposed for restoration plantings. **Figure 8** shows a planting plan for the temporarily impacted sewer line installation. While this area is currently no buffer, it will be used as buffer replacement and so will be considered buffer post construction (see below). Specific planting locations for the drainfield restoration are not shown as the line placement will be determined during installation to avoid damage to tree roots to the greatest extent possible.

### **Buffer Replacement**

There is unconstrained, forested area between the cabin and the Type S buffer that is contiguous with the Type N stream and protected steep slopes. The project proposes to use this area as buffer replacement to mitigate for part of the drainfield impacts, which are immediately adjacent to this area and similar in vegetation cover. This is proposed at a 1:1 ratio due to its proximity, on-site location, and similar site features such as forested with native vegetation. The balance of the drainfield impacts as well as the house and BSBL impacts are proposed to be mitigated for off-site. The following table details mitigation impacts and proposed mitigation ratios, size, and location. Off-site Mitigation is addressed in more detail in the following Bank Use Plan Section.

**Table 6 Impacts and Mitigation**

Impact Type	Impact Size (sf)	Proposed Mitigation Location	Ratio	Size (sf)
Building & BSBL of Type N Stream Buffer	2,842	Off-Site at SBMB	2:1	5,684
Temporary Impacts Sewer Line in proposed buffer replacement area	1,467	On-Site as Buffer Restoration	1:1	1,467
Drainfield in Type S Aquatic Buffer (any visible disturbance will also be restored)	2,155	On-Site as Buffer Replacement (1,669 sf)	1:1	1,669
		Off-Site at SBMB (486 sf)	3:1	1,458

**Mitigation Code Requirements**

The KCC 21A.24.380 includes specific mitigation requirements to compensate for adverse impacts associated with an alteration to an aquatic area or aquatic area buffers. These are listed below in bold text with responses to how they will be met by the project in italicized text. Many of these do not apply because the project is only impacting aquatic area buffer and not the aquatic area.

**A. Mitigation measures must achieve equivalent or greater aquatic area functions including, but not limited to:**

- 1. Habitat complexity, connectivity and other biological functions;**
- 2. Seasonal hydrological dynamics, water storage capacity and water quality; and**
- 3. Geomorphic and habitat processes and functions;**

*Items A#1-3* Mitigation proposed for the project will not result in a decrease in habitat complexity, connectivity or other biological functions. The cabin is proposed to be placed in the northern edge of the property near Denny Creek Road and over 200 feet from the South Fork of the Snoqualmie. The on-site drainfield meets all health department standards, will prevent water quality impacts, and be without visible disturbance once installed and restored. This will maintain habitat connectivity through the buffer to the river. While the house will be located within the buffer of the Type N stream, it will be located as close to the road as feasible, and will have a fence to demarcate permanently disturbed areas and protect the stream and buffer. Trees will be installed to the south in areas of the buffer that would benefit from screening and to promote structural diversity in this area of the forest. Additional mitigation through the habitat bank will mitigate for additional project impacts primarily the small loss of aquatic buffer habitat.

*Duff and soil amendments on-site and required stormwater management for the proposed cabin will prevent adverse hydrologic dynamics of the buffer such as water storage capacity.*

**B. To the maximum extent practical, permanent alterations that require restoration or enhancement of the altered aquatic area, aquatic area buffer or another aquatic area or aquatic area buffer must consider the following design factors, as applicable to the function being mitigated:**

- 1. The natural channel or shoreline reach dimensions including its depth, width, length and gradient;**

# PLANT SCHEDULE

## REPLACEMENT TREES

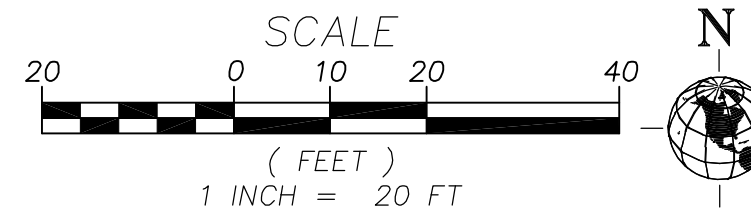
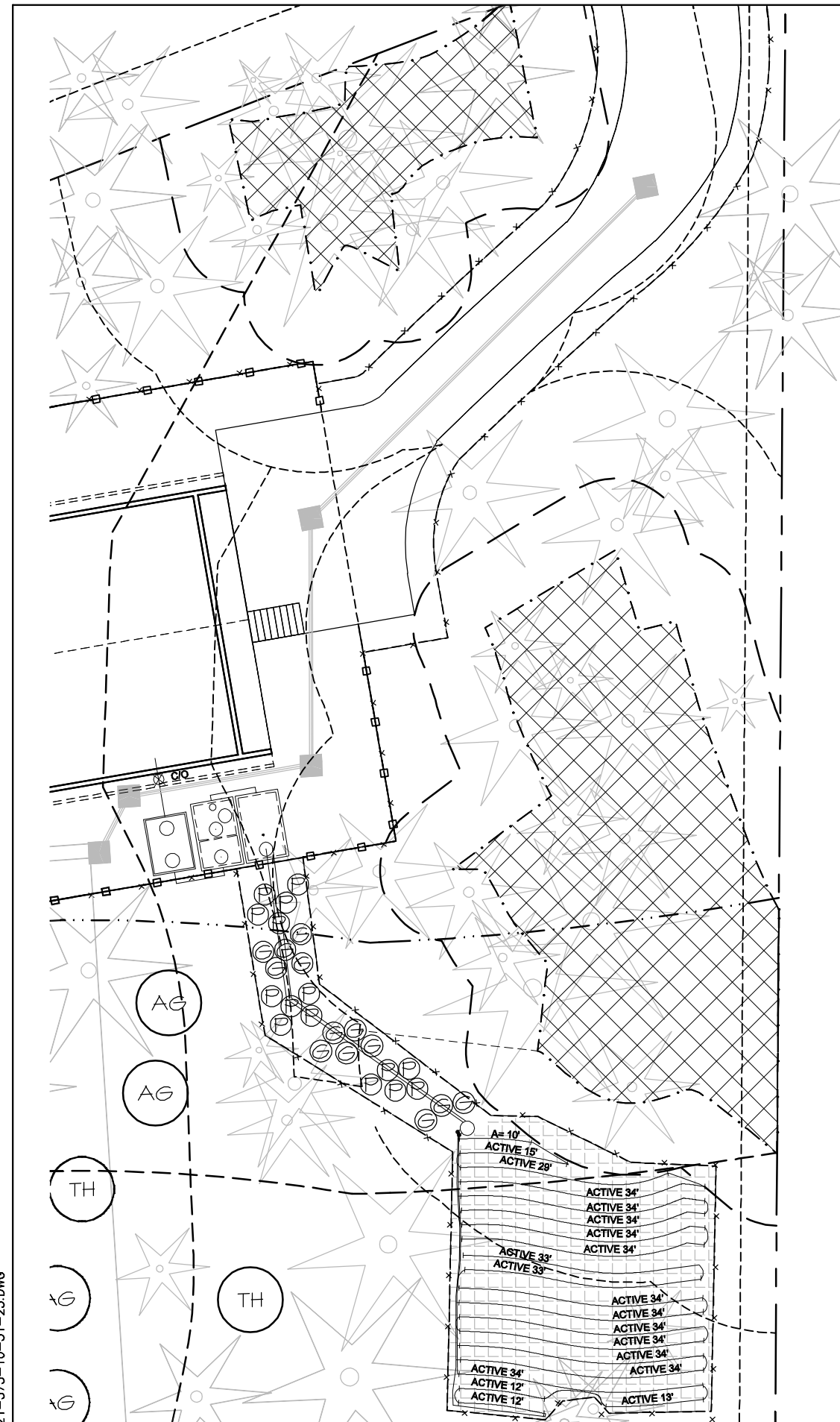
KEY	SCIENTIFIC NAME	COMMON NAME	SIZE (MIN.)	SPACING	QUANTITY
AG	ABIES GRANDIS	GRAND FIR	2 GAL.	AS SHOWN	12
TH	TSUGA HETEROPHYLLA	WESTERN HEMLOCK	2 GAL.	AS SHOWN	12

## SHRUBS

KEY	SCIENTIFIC NAME	COMMON NAME	SIZE (MIN.)	SPACING	QUANTITY
G	GAULTHERIA SHALLON	SALAL	1 GAL.	3' O.C.	13
P	POLYSTICHUM MUNITUM	SWORD FERN	1 GAL.	3' O.C.	15

## GROUNDCOVER

KEY	SCIENTIFIC NAME	COMMON NAME	SIZE (MIN.)	SPACING	QUANTITY
	ATHYRIUM FILIX-FEMINA	LADY FERN	1 GAL.	2' O.C.	67
	DICENTRA FORMOSA	BLEEDING HEART	1 GAL.	2' O.C.	67
	TELLIMA GRANDIFLORA	FRINGE CUP	1 GAL.	2' O.C.	67

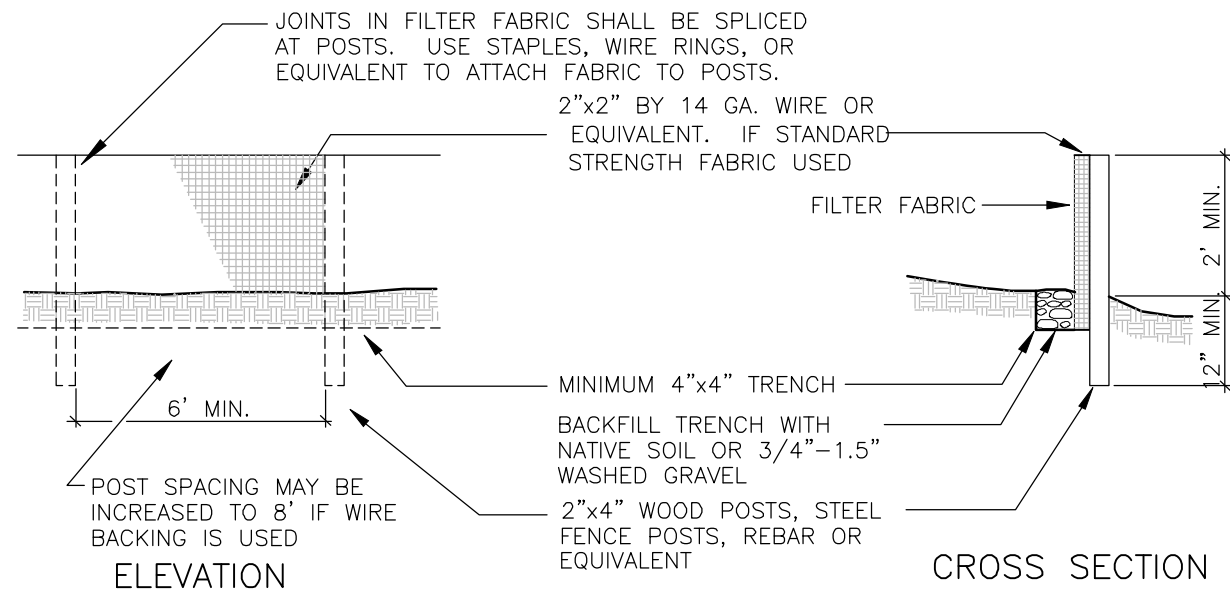


## NOTES

1. BASE INFORMATION PROVIDED BY EXURBAN DESIGNS, 24123 7TH AVE. WEST, BOTHELL, WA 98021, (360) 320-6297.

21-373-10-31-23.DWG

<b>AQUATICA</b> ENVIRONMENTAL CONSULTING, LLC P.O. BOX 308 DUVALL, WA 98019 T 425.802.8988	PLANTING PLAN ROAN ROCK RESIDENCE XXXXX SE DENNY CREEK RD. NORTH BEND, WA 98045 KING COUNTY PARCEL 18221-9026		DRAWN BY KG	CHECKED BY TO
			SCALE AS NOTED	DATE 10.31.23
			PROJECT NO. 21-373	
		FIGURE <b>8</b> OF <b>10</b>		

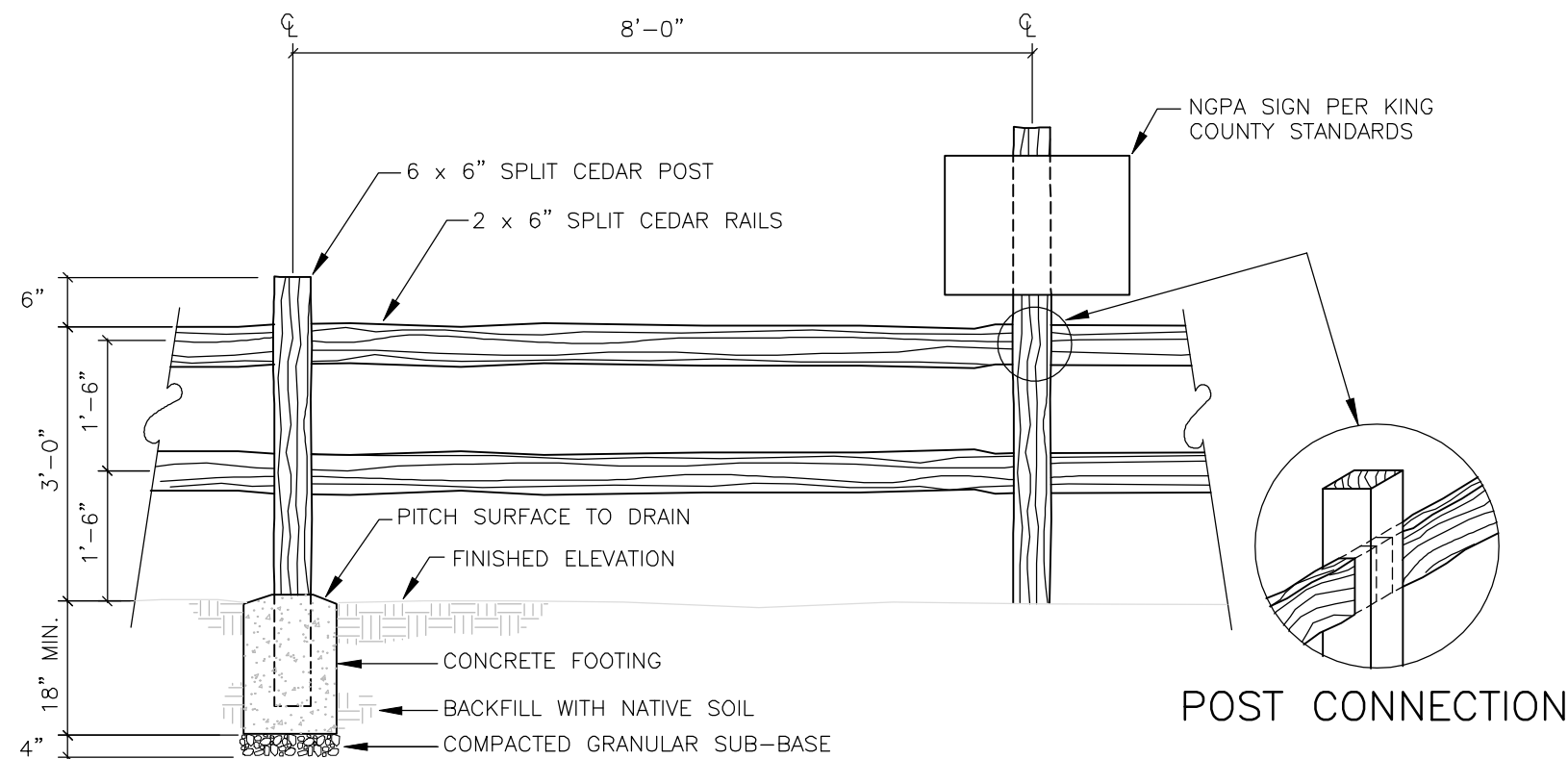


SILT FENCE MAINTENANCE STANDARDS:

1. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY.
2. IF CONCENTRATED FLOWS ARE EVIDENT UPSLOPE OF THE FENCE, THEY MUST BE INTERCEPTED AND CONVEYED TO A SEDIMENT POND.
3. CONTRACTOR SHALL CHECK THE UPSLOPE SIDE OF THE FENCE FOR SIGNS OF CLOGGING AND SUBSEQUENT CHANNELIZATION OF FLOWS PARALLEL TO THE FENCE. IF THIS OCCURS, REPLACE THE FENCE AND/OR REMOVE THE TRAPPED SEDIMENT.
4. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION EXCEEDS 6" IN DEPTH.

1 SILT FENCE

Scale: NTS



2 SPLIT-RAIL FENCE WITH SIGNS

Scale: NTS

21-373-10-31-23.DWG

<b>AQUATICA</b> ENVIRONMENTAL CONSULTING, LLC P.O. BOX 308 DUVALL, WA 98019 T 425.802.8988	CONSTRUCTION DETAILS ROAN ROCK RESIDENCE XXXXX SE DENNY CREEK RD. NORTH BEND, WA 98045 KING COUNTY PARCEL 18221-9026		DRAWN BY KG	CHECKED BY TO	
	SCALE AS NOTED	DATE 10.31.23	PROJECT NO. 21-373		
	FIGURE 9 OF 10				



# SPECIFICATIONS

## CONSTRUCTION/SPECIFICATIONS

- Prior to construction, the limits of work will be clearly staked at 20-foot intervals and all temporary erosion and sedimentation controls in place.
- Prior to planting, remove non-native species from planting area, including laurel and bamboo.
- Sheet mulch all buffer areas to be planted. Mulch shall be a minimum of 4" of coarse wood chips such as arborist chips.
- Species substitution shall not be made without approval of wetland biologist.
- Plants shall be locally grown (western Washington or Oregon), of normal health, vigorous, and free of weeds, diseases, insects, insect eggs and larvae.
- Container grown plants shall not be loose in container and shall not be pot-bound.
- B&B plant material shall not have cracked or mushroomed root balls. Root balls shall be firm, natural balls of earth of sufficient size to encompass the fibrous and feeding rooting system necessary for establishment and health of plant.
- Do not prune plants prior to delivery or planting.
- Take all precautions and customary good trade practices in preparing plants for transport. Cover plants transported on open vehicles with a protective covering to prevent wind burn.
- Protect plants from drying out. Bare root and B&B plant material shall have their roots kept moist at all times. Protect from freezing, wind, and sun. If planting is delayed by more than 24 hours, cover roots/root balls with sawdust, compost, or soil. Water plants as necessary.
- Water plants within 24 hours of planting.
- All receipts for labor and materials shall be retained for submittal to the County if requested.
- The bond holder shall replace any plants that die within the first year following approval of installation.

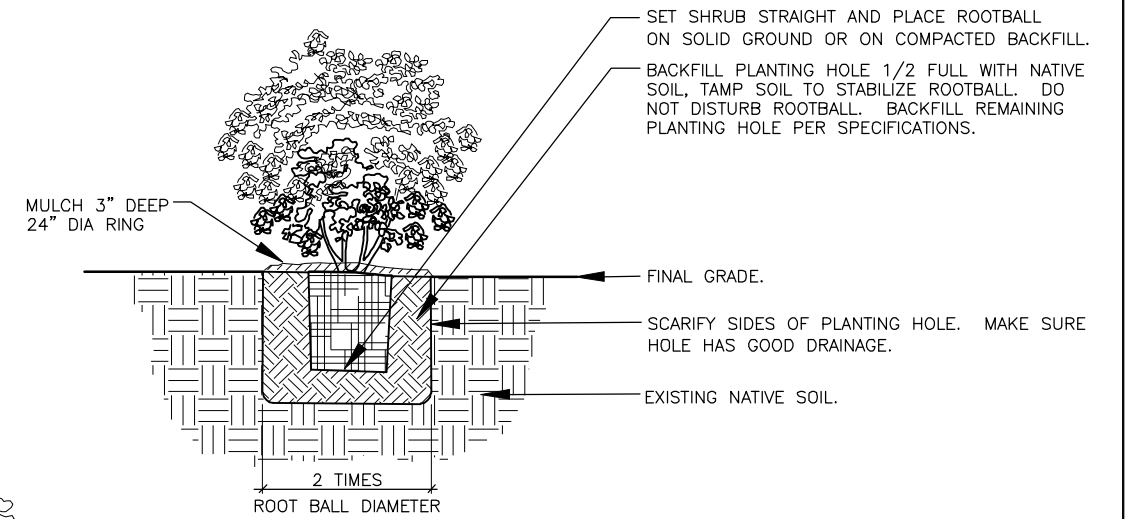
## SHRUB AND TREE SOURCES

STORM LAKE GROWERS  
MONROE, WA  
(360) 794-4842

OXBOW FARMS  
CARNATION, WA  
(425) 788-1134  
EXT. 4

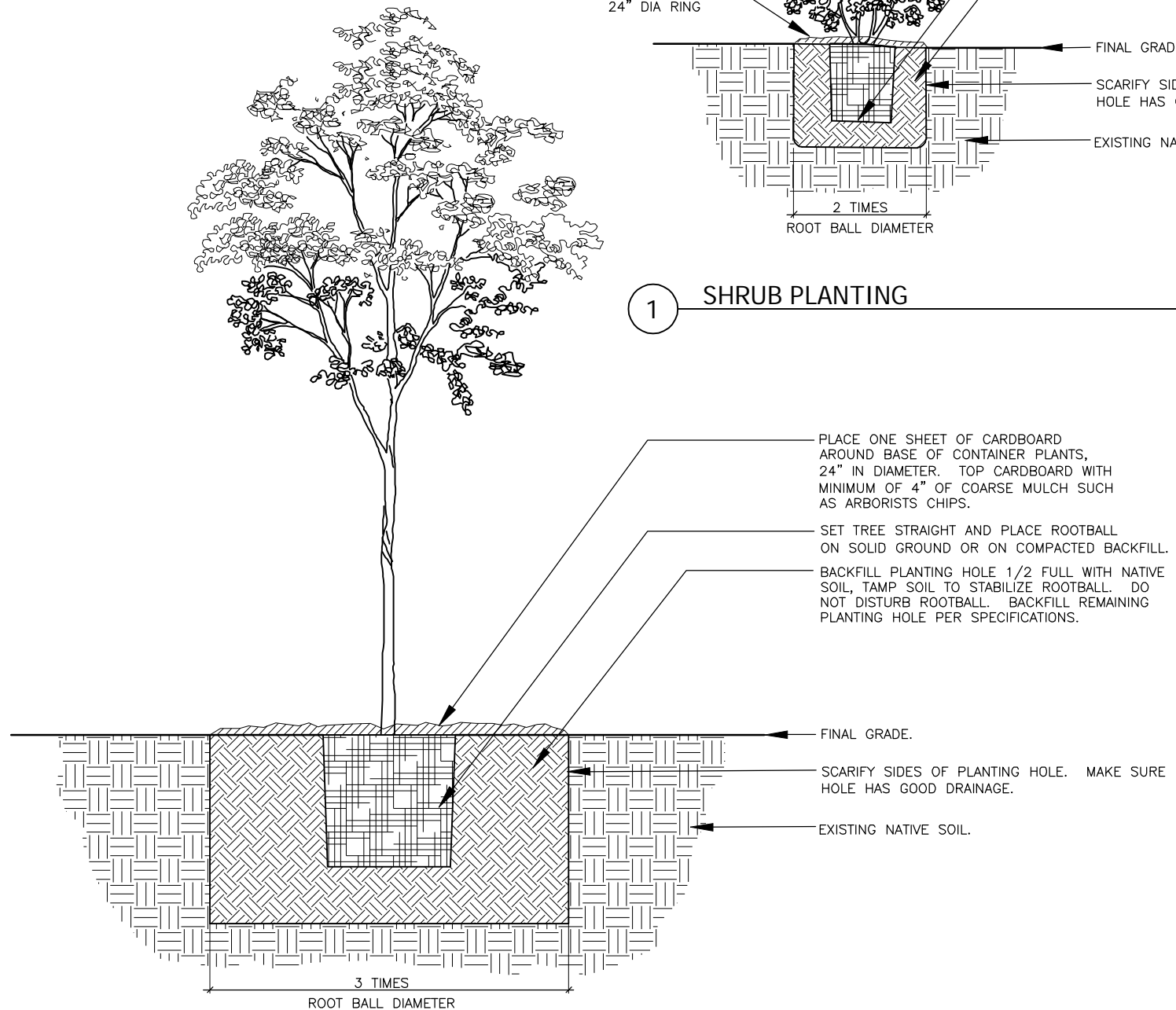
TADPOLE HAVEN NATIVE PLANTS  
WOODINVILLE, WA  
(425) 788-6100

KING COUNTY CONSERVATION DISTRICT  
[HTTP://KINGCD.ORG/PROGRAMS-NATIVE-WALK-UP-SALE.HTM](http://kingcd.org/programs-native-walk-up-sale.htm)



1 SHRUB PLANTING

Scale: NTS



2 TREE PLANTING

Scale: NTS

21-373-10-31-23.DWG

<b>AQUATICA</b> ENVIRONMENTAL CONSULTING, LLC P.O. BOX 308 DUVALL, WA 98019 T 425.802.8988	SPECIFICATIONS & PLANTING DETAIL ROAN ROCK RESIDENCE XXXXX SE DENNY CREEK RD. NORTH BEND, WA 98045 KING COUNTY PARCEL 18221-9026		DRAWN BY KG	CHECKED BY TO
	SCALE AS NOTED	DATE 10.31.23		
	PROJECT NO. 21-373			
	FIGURE 10 OF 10			

*Item B#1 is not applicable to the proposed project which is not occurring in or near the aquatic area, but rather on the outer edge of the buffer.*

**2. The horizontal alignment and sinuosity;**

*Item B#2 is not applicable to the proposed project which is not occurring in or near the aquatic area, but rather on the outer edge of the buffer.*

**3. The channel bed, sea bed or lake bottom with identical or similar substrate and similar erosion and sediment transport dynamics;**

*Item B#3 is not applicable to the proposed project which is not occurring in or near the aquatic area, but rather in the buffer.*

**4. Bank and buffer configuration and erosion and sedimentation rates; and**  
*Erosion and sedimentation is a concern for this site, as the project slopes towards streams in both the building area and the drainfield area. Between the drainfield and the river there is more than 100 feet of undisturbed native vegetation that will not be disturbed. The drainfield will also be installed in a low impact manner without heavy equipment and with all feasible erosion control BMP's. Between the house and the Type N Stream there is only 17 feet between the clearing area and the closest point of the stream. This area will not be cleared during the rainy season, will require construction fencing and all feasible erosion BMP's to prevent any silty or sediment laden water from entering the stream.*

**5. Similar vegetation species diversity, size and densities in the channel, sea or lake bottom and on the riparian bank or buffer;**

*Item #5: The project will restore vegetation with similar species that are growing on-site.*

**C. Mitigation to compensate for adverse impacts shall meet the following standards:**

**1. Not upstream of a barrier to fish passage;**

*The majority of mitigation for buffer impacts will be mitigated for off-site at the SBMB which is in an area that directly benefits fish.*

**2. Is equal or greater in biological function; and**

*As noted previously, under Items A#1-3, equivalent biological functions are expected.*

**3. To the maximum extent practical is located on the site of the alteration or within one-half mile of the site and in the same aquatic area reach at a 1:1 ratio of area of mitigation to area of alteration; or**

*Mitigation is proposed through maximizing on-site mitigation opportunities with the remainder proposed off-site using the SBMB. The project site is in a large area of undisturbed forest with few mitigation opportunities which is why the SBMB was selected. The SBMB was also determined to be the best possible option as it is already constructed, successful, and has mechanisms in place to provide long term protection and stewardship.*

**4. Is located in the same aquatic area drainage subbasin or marine shoreline and attains the following ratios of area of functional mitigation to area of alteration:**

**a. a 3:1 ratio for a type S or F aquatic area; and**

**b. a 2:1 ratio for a type N or O aquatic area;**

*These mitigation ratios for buffer impact have been applied.*

**D. For purposes of subsection C. of this section, a mitigation measure is in the same aquatic area reach if the length of aquatic area shoreline meets the following criteria:**

**1. Similar geomorphic conditions including slope, soil, aspect and substrate;**

**2. Similar processes including erosion and transport of sediment and woody debris;**

**3. Equivalent or better biological conditions including invertebrates, fish, wildlife and vegetation; and**

**4. Equivalent or better biological functions including mating, reproduction, rearing, migration and refuge; or**

**5. For tributary streams, a distance of no more than one-half mile;**

*Items D#1-5 Not applicable. The Aquatic Area is not being impacted, only buffer.*

**E. The department may reduce the mitigation ratios in subsection C. of this section to 2:1 ratio for a type S or F aquatic area and 1.5:1 ratio for a type N or O aquatic area if the applicant provides a scientifically rigorous mitigation monitoring program that includes the following elements:**

**1. Monitoring methods that ensure that the mitigation meets the approved performance standards identified by the department;**

**2. Financing or funding guarantees for the duration of the monitoring program; and**

**3. Experienced, qualified staff to perform the monitoring;**

*The standard ratios are being applied.*

**F. For rectifying an illegal alteration to any type of aquatic area or its buffer, mitigation measures must meet the following standards:**

**1. Located on the site of the illegal alteration at a 1:1 ratio of area of mitigation to area of alteration; and**

**2. To the maximum extent practical, replicates the natural prealteration configuration at its natural prealteration location including the factors in subsection B. of this section; and**

*Item F: Not applicable, no illegal alterations.*

**G. The department may modify the requirements in this section if the applicant demonstrates that, with respect to each aquatic area function, greater functions can be obtained in the affected hydrologic unit that the department may determine to be the drainage subbasin through alternative mitigation measures.**

*Item G: Not applicable*

**H. For temporary alterations to an aquatic area or its buffer that is predominately woody vegetation, the department may require mitigation in addition to restoration of the altered aquatic area or buffer.**

*Temporary alterations are proposed to a forested buffer however impacts are limited to the groundcover layer and will be restored through restoration of groundcover species that should establish quickly.*

### **Goal, Objectives, and Performance Standards**

*The following goal, objectives, and performance standards have been created to evaluate the success of the project.*

#### ***Goal 1:***

*Mitigate for hazard tree removal through tree replacement. Mitigate for temporary impacts by restoring an equivalent area of buffer as shown on Figure 7.*

**Objective A:** *Restore the groundcover layer in temporarily disturbed areas.*

**Performance Standard A:** *All plants that die at the end of Year 1 will be replaced. Percent survival of planted species must be at least 85% for each subsequent year of the monitoring period. After the third year of monitoring, the cover of a combination of native groundcover and woody species shall be at least 65 percent aerial coverage.*

**Objective B:** *Control invasive plants in the mitigation areas.*

**Performance Standard B:** *There are no invasives in the buffer. No invasive plants will be tolerated to become established in the restoration areas. Species include those on the King County Noxious Weed List.*

**Objective C:** *Increase the structural diversity of the aquatica area buffer and mitigate for hazard tree removal by planting conifers in the buffer.*

**Performance Standard C:** *All plants that die at the end of Year 1 will be replaced. Percent survival of planted species must be at least 85% for each subsequent year of the monitoring period.*

### **Planting Enhancement**

The plant species depicted on the mitigation plan were chosen for a variety of qualities, including adaptation to shade, value to wildlife, pattern of growth (structural diversity), erosion control value (dense fibrous root systems) and aesthetic values. Plant materials may consist of a combination of bare-root shrubs (during the dormant season) and container plants. Plants shall not be installed during the dry, summer months (generally July through September). The species selected included shade and drought tolerant plants adapted to the forested understory.

### **Irrigation**

The installed plantings must be watered regularly for at least the first year after planting. While native plants are drought tolerant, supplemental water is typically needed for the first year to ensure adequate plant establishment. Plants should receive 1” of water once per week – either through irrigation, natural rainfall, or a combination of both. Irrigation must be continued during subsequent years of the monitoring period if 1) the plants appear stressed from drought, 2) the summer is unusually hot and dry, or 3) a significant number of plants die and require replacing. Rain catchment is proposed to supply the cabin. Due to limited water supply, water could have to be brought to the site to water plants if they become drought stressed. However, this site does have a short growing season and is at a higher elevation and may have lower irrigation needs as a result. Plants will need to be monitored and watered during dry periods if necessary.

## **7.0 OFF-SITE MITIGATION and BANK USE PLAN**

The King County Code allows for the use of off-site mitigation, which is supported by State, Federal, and Best Available Science support for use of mitigation banks. Due to the lack of adequate on-site mitigation opportunities to fully mitigate for buffer impacts, use of an off-site mitigation bank is proposed to meet the requirements for no net loss of buffer functions.

Within the Puget Sound region, high quality opportunities for off-site mitigation are difficult to find, as is the scenario for this project. In addition to providing all possible on-site mitigation, the project is proposing to use the Snohomish Basin Mitigation Bank (SBMB), to mitigate for project impacts. Regulations and science has been evolving since wetlands, stream, and their buffers were first regulated and City and County codes created to address their protection. Federal and State agencies including the Washington State DOE and the USACE now prefer the use of mitigation banks when available and require their use whenever possible. This shift has occurred as the benefits of mitigation banks has become obvious and is supported by the best available science. These sites provide a guaranteed successful mitigation, as they are not

approved for use and cannot sell credits until they have been created and shown to be successful. The SBMB is sited in a high value location in the watershed for restoring wetland, stream and other aquatic habitat areas, and will be able to replace buffer area lost better than an exclusively on-site mitigation proposal. The following sections discuss SBMB Goals and Objectives, the County code requirements for mitigation, and information on bank credits, purchase and timing.

### **Mitigation Site Selection Rationale**

Compensatory mitigation requirements for the project are intended to replace the loss of aquatic resource functions caused by the project's construction activities. The permit applicant will contract with Mitigation Banking Services LLC., which is the management representative of both the Snohomish Basin Mitigation Bank and the Skykomish Habitat Mitigation Bank. The project is located within the same river basin and service area (Water Resource Inventory Area 7) for both bank projects. The applicant has chosen to use credits from the Snohomish Basin Mitigation Bank (SBMB) which is located on the Snoqualmie River, in the Snoqualmie River Basin in the east half of Section 35 and the west half of Section 36, Township 27 North, Rang 6 East, in Snohomish County Washington. The principle objectives of this mitigation bank project are to (1) re-establish and enhance wetland hydrology to a large historical wetland complex along Pearson Eddy which is connected to the Snoqualmie River, (2) restore historical riverine and depressional wetland function and habitat within the wetland and stream channel system (3) re-establish habitat connectivity and fish use of the system by restoring historical stream channels and meander scars across the site, which are hydrologically connected to the Snohomish River (4) remove invasive species on the site and increase the cover and structural diversity of native wetland plant species.

The SBMB is fully constructed. The project totals approximately 200 acres of wetland, riparian and upland habitats and is adjacent to additional restoration lands, helping to create a significant habitat corridor and connectivity across the Snoqualmie Valley. The bank project is also designed to improve and restore critical habitat for threatened and endangered Salmonids within the river basin by reconnecting the main stem of the Snoqualmie River to off-channel rearing and refuge habitat within the bank project. The loss of floodplain connectivity is a limiting factor in this system and the SBMB provides valuable rearing and refuge habitat for juvenile Coho and Chinook salmon during outmigration and high flows in the main stem of the river. Habitat types at the SBMB include forested, shrub, emergent and aquatic bed wetlands, riparian uplands and stream channel as well as forested floodplain upland habitat.

The SBMB has met all required performance standards applicable to the project for credit release. Given the size and scope wetland restoration and location on the Snoqualmie River the Snohomish Basin Mitigation Bank is the most suitable mitigation bank for the project's compensatory mitigation requirements. Under the Corps 2008 Federal Rule on Compensatory Mitigation, Mitigation Banks are generally the preferred solution for implementing successful mitigation as they have financial protections and guarantees, strict agency oversight and limit or eliminate temporal loss of wetland functions.

### **Confirmation of Mitigation Credit Availability**

As of the date of this report, the Snohomish Basin Mitigation Bank has 39.78 mitigation credits available for use and transfer. Mitigation credits are provided from the bank to an applicant's project using the suggested ratios in the table below, as approved by the USACE and Washington State Department of Ecology. These credits are calculated after applying the required King County mitigation ratio which is 2:1 for off-site mitigation for Type N Aquatic Areas and 3:1 for Type S Aquatic Areas. After the required square footage required by County mitigation ratios is applied the credit ratio is applied to determine the required credits.

Permanent Resource Impact	Credit to Impact Ratio
Wetland, Category I	Case by case
Wetland, Category II	1.2 to 1
Wetland, Category III	1.0 to 1
Wetland, Category IV	.85 to 1
Critical Area Buffer	.2 to 1
Stream	Case by case

The Snohomish Basin Wetland Mitigation Bank project has undergone an extensive permitting and review process which involved input and direction from multiple agencies and reviewing groups. Based on work accomplished, credits have been approved and released for sale by the Interagency Review Team (IRT) co-chaired by the US Army Corps of Engineers and the Washington State Department of Ecology. The site development plan for the SBMB is detailed in the bank's Mitigation Banking Instrument (MBI). This plan was prepared in consultation with the IRT and follows specific requirements of Chapter 173-700 WAC for Wetland Mitigation Banks. The following agencies participated in the development of the banking instrument:

- US Army Corps of Engineers, Seattle District
- US Environmental Protection Agency
- Washington Department of Ecology
- Washington Department of Fish and Wildlife
- Washington Department of Natural Resources, Aquatic Resources Division
- Snohomish County
- King County

### **Wetland Functions Provided at the SBMB**

The table below summarizes the original preexisting wetland functions prior to construction and the increase in functions that have occurred with implementation of the SBMB. A substantial increase in wetland function has resulted from the completed SBMB, generally rising from low values, to moderate to high values. This “ecological lift” forms the basis for bank credits that compensate for impacts to wetlands, streams, buffers, and other resources in the service area.

**Table 7 Summary of Wetland Functional Assessment Under Pre Construction Conditions Compared to Project Implementation**

WETLAND FUNCTION	EXISTING CONDITION	WITH PROJECT IMPLEMENTATION
Groundwater Recharge	Low	Moderate to High
Groundwater Discharge	Low to Moderate	Moderate to High
Flood Storage and De-synchronization	Moderate	Moderate to High
Shoreline Anchoring and Dissipation of Erosive Forces	Low to Moderate	Very High
Sediment Trapping	Low to Moderate	Moderate to High
Nutrient/Pollutant Retention, Removal, Transformation, and/or Transport	Low	Moderate to High
Food Chain Support	Very Low to Low	Moderate to High
Wildlife and Fish Habitat	Very Low to Low	High to Very High
OVERALL	Low	Moderate to High

\*Snohomish Basin Mitigation Bank MBI, July 2005

Below is a summary of wetland functions provided at the SBMB, broken down by category:

**Hydrology**

The SBMB provides flood storage and the desynchronization of flood flows for the Snoqualmie River as well as erosion and shoreline protection through the reduction of peak flows and attenuation of storm water runoff rates to the lower Snohomish Basin. Groundwater recharge to the hyporheic zone of the Snoqualmie River occurs from slowing storm water runoff and flood flows and detaining it in the low lying riverine and depressional wetlands at the SBMB. Additionally during high flows in the Snoqualmie River, the SBMB wetlands collect and retain sediment and reduce sediment transfer rates to the lower watershed.

**Water quality**

The SBMB wetlands filter heavy nutrient loads, chemical contaminants and heavy metals from storm water runoff, road runoff and agriculture activities upstream from the bank site. Given the bank’s landscape position, the wetlands at the SBMB act as a natural filter for surface water

flows that enter the bank site upstream and eventually exit into the Snoqualmie River and Pearson Eddy. Water quality testing conducted in June of 2009 for microbiological, demand and nutrient loads showed a significantly reduced level of Fecal Coliform and Total Nitrogen Loads discharged from the bank site compared to samples taken from flows entering the bank site upstream and from the surrounding drainage ditches (*AmTest Laboratories SBMB project June 2009*).

## **Wildlife Habitat**

The SBMB project encompasses a large area with varying aquatic and terrestrial habitat types. Floodplain upland, aquatic bed, emergent, shrub and forested wetlands create a mosaic of habitat types and structural diversity throughout the site. Restoration activities have improved food chain support and species richness, providing habitat for fish, amphibians, mammals and birds. To illustrate the level of habitat connectivity achieved at the bank site, large mammals such as elk, deer and bear have been observed using the site as a connective corridor to their higher elevation habitat areas.

The SBMB is also providing off channel rearing and refuge for juvenile salmonids during high flows in the main stem of the Snoqualmie River. According to the 2005 Snohomish River Basin Salmon Conservation Plan, the lack of rearing and refuge habitat on the main stem of the Snoqualmie River is a limiting factor for juvenile salmonids. Fish presence surveys were conducted in 2013 to study and document what fish species are using the SBMB at different points of the year. Survey results indicate that juvenile Coho and Chinook use the bank for the majority of the year to forage and seek refuge off the mainstem of the Snoqualmie River. Additionally, cutthroat and rainbow trout were documented in the bank site presumably for the same reasons (SBMB Stream Habitat Survey Report 2013)

## **Pre and Post Construction SBMB Wetland and Stream Acreages**

**Below is a table of pre construction and the implemented SBMB following construction of each phase of the bank site. Table 8 shows the area acreages of restored habitat in each phase. The SBMB has restored 135.4 acres of Category II wetlands.**

Table 9 shows the mix of different habitat types restored to the site from the pre-construction condition in acres and length of stream restoration in linear feet.

### **Table 8 SBMB Pre and Post Construction Acreages**



RESTORATION PHASE	Pre Construction Conditions (acres)			Implemented SBMB Conditions (acres)		
	Effectively Drained Wetlands and Other Uplands	Farm Wetland	Total	Wetland	Upland	Stream and Riparian
Phase 1	36.4	4.4	40.8	21.6	19.2	0
Phase 2	96.2	18.8	115.0	99.9	15.1	0
Phase 3	41.8	1.4	43.2	32.7	8.4	2.1
<b>Total Acres</b>	<b>174.4</b>	<b>24.6</b>	<b>199.0</b>	<b>154.2</b>	<b>42.7</b>	<b>2.1</b>

**Table 9 Mix of SBMB Habitat Types**

HABITAT	Pre-Construction Conditions (acres)			Implemented SBMB Conditions (acres)			
	Effectively Drained Wetlands and Other Uplands	Farmed Wetland	Total	Phase 1	Phase 2	Phase 3	Total
Perimeter Buffer	0	0	0	5.9	5.3	10.8	22.0
Floodplain Upland	0	0	0	15.3	12.0	2.9	30.2
Forested Wetland	0	0	0	6.8	14.4	4.7	25.9
Scrub-Shrub Wetland	0	0	0	4.2	20.4	13.5	38.1
Emergent Wetland (wet meadow, marsh)	0	0	0	8.4	59.8	11.3	79.5
Aquatic Bed Wetland	0	0	0	0.2	3.1	0	3.3
Pasture	174.4	24.6	199.0	0	0	0	0
<b>Total Acres</b>	<b>174.4</b>	<b>24.6</b>	<b>199.0</b>	<b>40.8</b>	<b>115.0</b>	<b>43.2</b>	<b>199.0</b>
Stream Channel (linear feet)	0	0	6400lf	0	6600lf	2400lf	9000lf

\*Snohomish Basin Mitigation Bank MBI 2005

**Monitoring and Reporting**

Section 12.0 of the SBMB MBI details Monitoring, Reporting, and Remedial Actions including as-built reports for each phase of construction; annual monitoring reports that document the condition of the SBMB and its progress toward achieving goals, objectives, and performance standards; monitoring of hydrology and the functioning of relocated streams and drainages; and vegetation survival monitoring. Monitoring report content and schedules are prescribed.

Specific methodology for monitoring is correlated to the various performance standards. For example, permanent monitoring wells will be used to determine presence of wetland hydrology during years 3, 5, and 7 for Performance Standard 2B. Wetland delineation will be conducted in years 7 and 10 to satisfy Performance Standard 2E. Permanent vegetation plots will be used in years 3, 5, 7, and 10 to assess plant density and percent survival to satisfy Performance Standards 4B through 4I. Methodology and reports are submitted and reviewed by the IRT. If the bank is successful in achieving its performance standards, the associated credits for those performance standards are released.

**Credit Purchase and Timing**

Roan Rock LLC will enter into a Purchase Agreement with the representative of the Snohomish Basin Mitigation Bank, Mitigation Banking Services LLC to purchase credits that would appropriately mitigate for the proposed project impacts. The anticipated timing of credit purchase and transfer will follow permit issuance by the agencies with jurisdiction. Purchase of credits will be completed prior to the onset of any activities affecting impacted resources. Nothing in the Purchase Agreement shall be interpreted as permitting or construed to permit any activity that otherwise requires a federal, state and/or local permit. Proof of the credit purchase and transfer will be provided in the form a notification letter to the approving agencies and to the IRT co-chairs by the Bank Sponsor. Upon service of this notification, the mitigation requirement to purchase mitigation credits will be fully satisfied. Table 10 summarizes the SBMB credits required per project impacts.

**Table 10 SBMB Credits Required for Project**

Permanent Resource Impact	Project Impacted Square footage needing off-site Mitigation	KCC Required Mitigation Ratio and Needed Off-site Mitigation	Proposed Credits (per acre)*
Type N Aquatic Area Buffer	2,842	2:1, 5,684 sf	0.026
Type S Aquatic Area Buffer	486	3:1, 1,458 sf	0.006
Total		7,142 sf	0.032
Total Cost (\$265k per credit)			\$8,663

\*Credit impact ratio calculation for buffer is 0.2 per DOE MBI (column 2 sf x 0.2/43,560=credit)

**Table 11 Bank Contacts**

For more information about the bank contact	IRT (Interagency Review Team) Contacts	
	Department of Ecology	Corps of Engineers
<i>Habitat Bank LLC.</i> Zach Woodward Project Manager P.O. Box 354 Kirkland, WA 98033 Phone: (425) 205-0279 Email: <a href="mailto:Zachary.woodward@habitatbank.com">Zachary.woodward@habitatbank.com</a>	Kate Thompson Shorelands and Environmental Assistance Program P.O. Box 47600 Olympia, WA 98504 (360) 407-6749 <a href="mailto:kate.thompson@ecy.wa.gov">kate.thompson@ecy.wa.gov</a>	Suzanne L. Anderson, PhD, PWS Project Manager/Banking Lead Seattle District U.S. Army Corps of Engineers Regulatory Branch, CENWS-OD-RG Mail Address: P.O. Box 3755 Seattle, WA 98124-3755

See also: <a href="http://www.habitatbank.com">www.habitatbank.com</a>		Building Location: 4735 East Marginal Way South Seattle, WA 98134 Email: Suzanne.I.Anderson@usace.army.mil
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### **Functions not Mitigated at the Bank**

As detailed in the on-site mitigation section, stream buffers will be enhanced where needed on-site to provide screening and enhance the structural diversity of the forest and are not exclusively mitigated at the SBMB. This will also mitigate for hazard tree proposed to be snagged or toppled in the buffers that are outside of the clearing limits. The on-site mitigation plan also provides for restoration of temporarily impacted areas. The on-site enhancement and restoration proposed will mitigate the buffers ability to bind soil, slow the flow of water, and provide screening of the development while preventing no net loss of functions in the shoreline environment. These actions cannot be mitigated for solely off-site.

## **8.0 IMPACT ANALYSIS**

The functions and values provided by stream buffers and shorelines include a variety of water quality, groundwater, and wildlife functions. Details regarding how the project will affect these functions, and compare to the existing conditions are described below.

1. **Pollution Assimilation and Sediment Retention.** Dense vegetation in buffer areas absorbs nutrients, such as excess nitrogen through uptake by roots, which aids in maintaining water quality. Clay and organic soils that may be present in some wetlands are also able to adsorb some contaminants in water. The soils in the buffer are relatively sandy however, so the buffers capacity to perform this function through adsorption is limited. However, the buffer areas do have dense native vegetation. The dense fibrous root systems of these species aids in the assimilation and sediment retention function of the buffer areas. With mitigation, the project will restore temporarily disturbed areas and enhance sparsely vegetated areas to prevent loss of value to this function. As described in the bank use plan, these functions are also replaced through off-site mitigation. No negative impacts to shoreline functions for these are expected to due the minimal impacts in the shoreline zone. The drainfield meets all health department required setbacks to protect water quality and installation will have minimal impacts.
2. **Stream Baseflow maintenance.** Stream buffer areas capture, infiltrate, and release water to down gradient streams. The project is proposing impacts to about 5% of the property and impervious surfaces will be even less. This project utilizes rainwater collection as the sole water source which will provide additional storage of water during heavy rain events. No loss of water from the property will occur as water is either infiltrated back into the soil via the infiltration trench or slowly released into the on-site drainfield. This will prevent negative impacts to floodwater attenuation, storage and groundwater recharge.
3. **Wildlife Habitat and Movement Corridors.** This site provides habitat for a variety of species as included in the wildlife assessment portion of the report. The proposed project

will not result in significant impacts to the most valuable portion of the property which is the 165-foot riparian zone adjacent to the river. The cabin will be placed as near to the road (an existing disturbance corridor) as feasible. To further minimize impacts the buffer will be enhanced to provide additional screening to the proposed structure to preserve the ability of the site to provide this function. The small portion of the site proposed for development, its location near the road, and mitigation provided will not result in negative impacts to wildlife. Post development, there will be a 200-foot intact shoreline zone that is forested and undisturbed.

4. Large Woody Debris and Organic Matter Recruitment. Over time, forested buffers contribute large woody debris and organic matter to streams. This contribution supplies nutrients, provides wildlife cover and habitat for animals such as amphibians and populations of invertebrates that depend on these features can also help fish populations further downstream. This site is forested and performs this function well. This site has abundant downed wood in the buffer and dense trees and snags in the buffers. There will no alteration to trees in the shoreline zone and no impacts to this function in the shoreline zone are expected. The project will result in tree removal for the cabin which could negatively impact woody debris and organic recruitment for the nearby stream. To mitigate these impacts trees removed from the buffer for hazard tree removal will be left in the buffer and the project includes a tree replacement plan for all trees removed in buffer areas to prevent impacts to this function.
5. Floodwater Attenuation and Storage, Groundwater Recharge  
The project will prevent negative impacts to this function through minimizing the overall scope of the project including the minimum possible house footprint and driveway as well as adhering to King County drainage requirements. Through revegetating degraded areas and temporary disturbed areas and installation of dispersal trench, this function will not be negatively impacted as evapotranspiration and uptake of groundwater by planted material slows the fall of precipitation with layers of vegetation. These vegetation attributes reduce the speed water reaches the ground surface and eventually streams. The proposed home will be built according to current stormwater standards and water will not flow directly into the stream from the road surface, or the house. This project utilizes rainwater collection as the sole water source which will provide additional storage of water during heavy rain events. No loss of water from the property will occur as water is either infiltrated back into the soil via the infiltration trench or slowly released into the on-site drainfield. This will prevent negative impacts to floodwater attenuation, storage and groundwater recharge.
6. Temperature Maintenance. Buffers provide temperature maintenance of wetlands, streams and shorelines through provision of a forested canopy. Forests moderate temperature through the provision of shade, and the decrease in evaporation from the ground surface, resulting in a significant difference in temperature compared to sites that are developed or cleared. The only significant tree removal will be for the cabin footprint which will leave the remainder of the property forested. Through revegetating disturbed areas of the site with three layers of vegetation, these measures will result in no net loss of function to temperature maintenance. This project leaves the entire 200-foot shoreline zone forested and the project will have no negative impacts to the shoreline functions for temperature maintenance. .

7. **Streambank Stabilization.** This function is related to the pollution assimilation and sediment retention function on this site. Stream banks on this property are stable and forested. The property post-development will be in this same condition with additional understory vegetation added to increase the capacity of the property to bind soil and prevent erosion. The project will have no negative shoreline impacts to this function, as the entire 200-foot shoreline zone will remain forested. The small area proposed for drainfield installation will be minor, installed in allow impact manner and restored.

**9.0 Monitoring Program**

Performance monitoring of the mitigation areas will be conducted for a period of three years, with reports submitted to King County according to the schedule presented in **Table 1**. Reports shall be submitted by December 31<sup>st</sup> during each year of the monitoring period.

**Table 12 Projected Calendar for Performance Monitoring and Maintenance Events**

Year	Date*	Maintenance Review	Performance Monitoring	Report Due to County
1	at installation	X	X	X
	Fall 2024	X	X	X
2	Spring 2025	X	X	
	Fall 2025	X	X	X
3	Spring 2026	X	X	
	Fall 2026	X	X	X**

\*Schedule depends on permit approval and implementation date and calendar may change accordingly.

\*\*Request approval for release of bond from King County (presumes performance criteria are met).

**Reports**

Each monitoring report will include a) estimates of percent vegetative cover, plant survival, and invasive species, b) wildlife usage, c) photo-documentation, d) an overall qualitative assessment of project success for the mitigation areas, and e) maintenance recommendations. The first monitoring report will serve as the baseline assessment report. If the performance criteria are met, monitoring will cease after the third year.

**Photo Documentation**

A series of color photographs representing views of the mitigation areas will be taken during each monitoring event. Photographs will be included with the performance monitoring reports.

**10.0 MAINTENANCE (M) and CONTINGENCY (C)**

Maintenance will be performed regularly to address any conditions that could jeopardize the success of the mitigation areas. During maintenance reviews (schedule shown in **Table 1**), any

maintenance items requiring attention will be identified and reported to the property owner. Maintenance items requiring attention shall be completed within 30 days of the monitoring event.

Established performance standards for the project will be compared to the monitoring results to judge the success of the mitigation project. If there is a significant problem with the mitigation achieving its performance standards, the Bondholder shall work with King County to develop a Contingency Plan. Contingency plans can include, but are not limited to additional plant installation, erosion control, modifications to hydrology, and plant substitutions of type, size, quantity, and location. Such contingency Plan shall be submitted to the County by December 31 of any year when deficiencies are discovered.

Contingency and maintenance items may include many of the items listed below and would be implemented if performance standards are not met. Maintenance and remedial action on the site will be implemented immediately upon completion of the monitoring event (unless otherwise specifically indicated below).

- During year one, replace all dead plant material. (M)
- Water all plantings at a rate of 1” of water at least every week between June 15 – September 15 during the first year after installation, and for the first year after any replacement plantings. (C & M)
- Replace dead plants with the same species or a substitute species that meets the goal and objectives of the mitigation plan, subject to the approval of the wetland biologist. (C)
- Re-plant area after reason for failure has been identified (e.g., moisture regime, poor plant stock, disease, shade/sun conditions, wildlife damage, etc.). (C)
- Weed trees and shrubs to the drip line, by hand. Do not use mechanized devices, herbicides, or pesticides. Maintain mulch rings around trees and shrubs at a depth of 3 inches. (M)
- Remove and control invasive plants listed on the King County Noxious Weed List (e.g., Scot's broom, reed canarygrass, Himalayan blackberry, , etc.). All non-native vegetation must be removed and dumped off site. (C & M)
- Clean up trash and other debris. (M)

#### **11.0 PERFORMANCE GUARANTEES**

A maintenance/monitoring bond equal to the estimated installation, maintenance, monitoring, and contingency costs for the three-year monitoring period may be required by the County prior to finalization of the building permit (see **Error! Reference source not found.**).

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**12.0 REFERENCES**

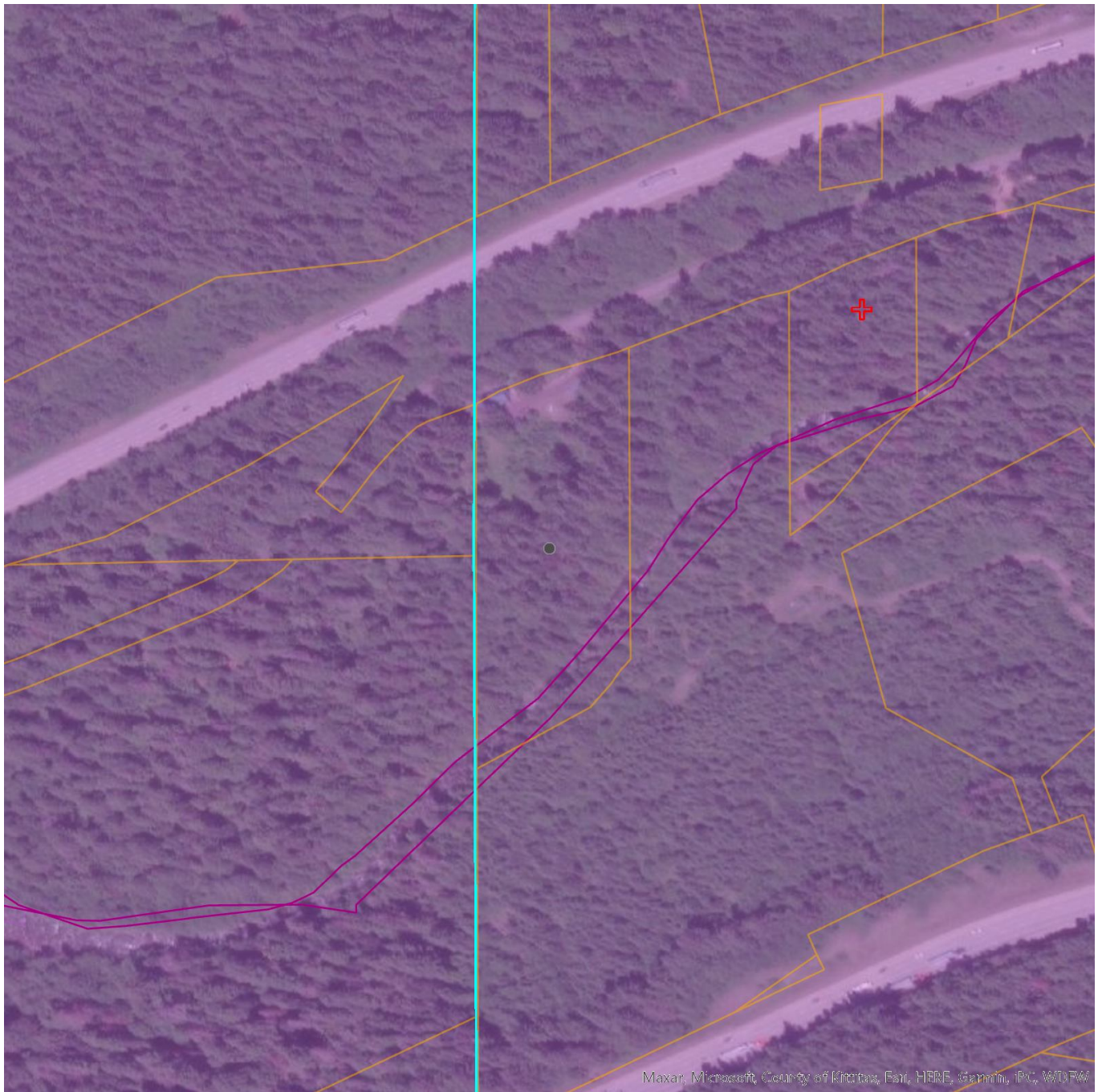
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- Wetlands Northwest. 2020. *Critical Area Study*. October 22, 2023
- Washington Department of Natural Resources. 2009. *Washington Herp Atlas*. Updated 2017

## Appendix A: Publicly Available Version of PHS Report





# Priority Habitats and Species on the Web



**Buffer radius: 330 Feet**

**Report Date: 05/11/2023**

## PHS Species/Habitats Overview:

Occurrence Name	Federal Status	State Status	Sensitive Location
Elk	N/A	N/A	No
Gray wolf	Endangered	Endangered	Yes
Northern Spotted Owl	Threatened	Endangered	Yes

## PHS Species/Habitats Details:

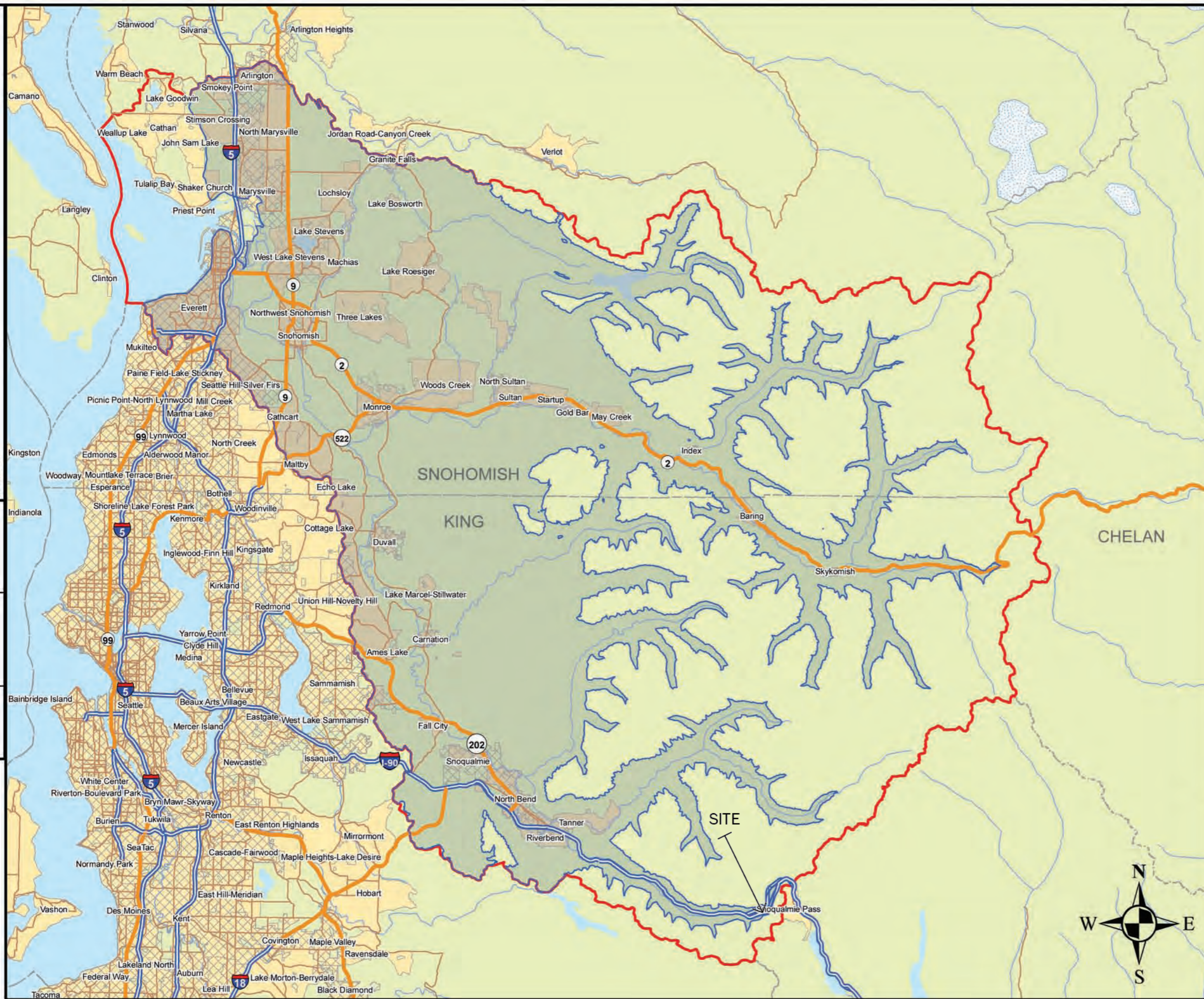
Elk	
Scientific Name	<i>Cervus elaphus</i>
Priority Area	Regular Concentration
Site Name	GREEN/CEDAR RIVER
Accuracy	General locality
Notes	GREEN/CEDAR RIVER WINTER ELK RANGE.KING COUNTY ELK HABITAT INCLUDES RESIDENT AND WINTER MIGRATORY ELK.
Source Record	918540
Source Dataset	PHSREGION
Source Name	SPENSER, ROCKY WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	<a href="http://wdfw.wa.gov/publications/pub.php?id=00614">http://wdfw.wa.gov/publications/pub.php?id=00614</a>
Geometry Type	Polygons

Gray wolf	
Scientific Name	<i>Canis lupus</i>
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at <a href="mailto:phsproducts@dfw.wa.gov">phsproducts@dfw.wa.gov</a> for obtaining information about masked sensitive species and habitats.
Federal Status	Endangered
State Status	Endangered
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	Y
Display Resolution	TOWNSHIP

Northern Spotted Owl	
Scientific Name	<i>Strix occidentalis</i>
Notes	This polygon mask represents one or more records of the above species or habitat occurrence. Contact PHS Data Release at <a href="mailto:pdsproducts@dfw.wa.gov">pdsproducts@dfw.wa.gov</a> for obtaining information about masked sensitive species and habitats.
Federal Status	Threatened
State Status	Endangered
PHS Listing Status	PHS Listed Occurrence
Sensitive	Y
SGCN	Y
Display Resolution	TOWNSHIP
ManagementRecommendations	<a href="http://wdfw.wa.gov/publications/pub.php?id=00026">http://wdfw.wa.gov/publications/pub.php?id=00026</a>

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necessary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

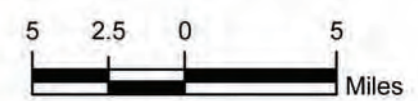
## Appendix B: SBMB Service Area



**Legend**

-  Interstate
-  Highway
-  Service Area
-  Snohomish WRIA
-  Urban Growth Areas
-  County Boundary
-  Cities/Towns/Places

**Notes:**  
 1. The elevation limit for the Service Area boundary is less than 2,500 feet above mean sea level as shown.  
 2. The elevation data was provided by the USDA Geospatial Data Gateway at <http://datagateway.nrcs.usda.gov>.  
 3. Roads and infrastructure data provided by ESRI's Street Map USA.



REFERENCE/PROJECTION:  
 NAD\_1983\_StatePlane\_Washington\_North\_FIPS\_4601

**Service Area Map**



DRAWING NUMBER

DRAWN BY

OFFICE

SITE

## Appendix C: Bond Quantity Worksheet



Department of Permitting and  
Environmental Review  
35030 SE Douglas Str, Suite 210  
Snoqualmie, WA 98065-9266  
206-296-6600 TTY Relay: 711

**King County**

**Critical Areas Mitigation  
Bond Quantity Worksheet**

C24 09/09/2015  
Is-wks-sensareaBQ.xls  
Is-wks-sensareaBQ.pdf

Roan Rock LLC

Date: 1-Nov-23 Prepared by: Teresa Opolka

21-373

Buffer Restoration

Denny Creek Road

Applicant: Road Rock LLC

Phone:

**PLANT MATERIALS (includes labor cost for plant installation)**

Type	Unit Price	Unit	Quantity	Description	Cost
PLANTS: Potted, 4" diameter, medium	\$5.00	Each			\$ -
PLANTS: Container, 1 gallon, medium soil	\$11.50	Each	229.00		\$ 2,633.50
PLANTS: Container, 2 gallon, medium soil	\$20.00	Each	24.00		\$ 480.00
PLANTS: Container, 5 gallon, medium soil	\$36.00	Each			\$ -
PLANTS: Seeding, by hand	\$0.50	SY			\$ -
PLANTS: Slips (willow, red-osier)	\$2.00	Each			\$ -
PLANTS: Stakes (willow)	\$2.00	Each			\$ -
PLANTS: Stakes (willow)	\$2.00	Each			\$ -
PLANTS: Flats/plugs	\$2.00	Each			\$ -
<b>TOTAL</b>					<b>\$ 3,113.50</b>

**INSTALLATION COSTS ( LABOR, EQUIPMENT, & OVERHEAD)**

Type	Unit Price	Unit	Quantity	Description	Cost
Compost, vegetable, delivered and spread	\$37.88	CY			\$ -
Decompacting till/hardpan, medium, to 6" depth	\$1.57	CY			\$ -
Decompacting till/hardpan, medium, to 12" depth	\$1.57	CY			\$ -
Hydroseeding	\$0.51	SY			\$ -
Labor, general (landscaping other than plant installation)	\$40.00	HR			\$ -
Labor, general (construction)	\$40.00	HR			\$ -
Labor: Consultant, supervising	\$55.00	HR	6.00		\$ 330.00
Labor: Consultant, on-site re-design	\$95.00	HR			\$ -
Rental of decompacting machinery & operator	\$70.00	HR			\$ -
Sand, coarse builder's, delivered and spread	\$42.00	CY			\$ -
Staking material (set per tree)	\$7.00	Each			\$ -
Surveying, line & grade	\$250.00	HR			\$ -
Surveying, topographical	\$250.00	HR			\$ -
Watering, 1" of water, 50' soaker hose	\$3.62	MSF			\$ -
Irrigation - temporary	\$3,000.00	Acre			\$ -
Irrigation - buried	\$4,500.00	Acre			\$ -
Tilling topsoil, disk harrow, 20hp tractor, 4'-6" deep	\$1.02	SY			\$ -
<b>TOTAL</b>					<b>\$ 330.00</b>

**HABITAT STRUCTURES\***

ITEMS	Unit Cost	Unit	Quantity	Description	Cost
Fascines (willow)	\$ 2.00	Each			\$ -
Logs, (cedar), w/ root wads, 16"-24" diam., 30' long	\$1,000.00	Each			\$ -
Logs (cedar) w/o root wads, 16"-24" diam., 30'	\$400.00	Each			\$ -
Logs, w/o root wads, 16"-24" diam., 30' long	\$245.00	Each			\$ -
Logs w/ root wads, 16"-24" diam., 30' long	\$460.00	Each			\$ -
Rocks, one-man	\$60.00	Each			\$ -
Rocks, two-man	\$120.00	Each			\$ -
Root wads	\$163.00	Each			\$ -
Spawning gravel, type A	\$22.00	CY			\$ -
Weir - log	\$1,500.00	Each			\$ -
Weir - adjustable	\$2,000.00	Each			\$ -
Woody debris, large	\$163.00	Each			\$ -
Snags - anchored	\$400.00	Each			\$ -
Snags - on site	\$50.00	Each			\$ -
Snags - imported	\$800.00	Each			\$ -
<b>TOTAL</b>					<b>\$ -</b>

\* All costs include delivery and installation

**EROSION CONTROL**

ITEMS	Unit Cost	Unit	Quantity	Description	Cost
Backfill and Compaction-embankment	\$ 4.89	CY			\$ -
Crushed surfacing, 1 1/4" minus	\$30.00	CY			\$ -
Ditching	\$7.03	CY			\$ -
Excavation, bulk	\$4.00	CY			\$ -
Fence, silt	\$1.60	LF	224.00		\$ 358.40
Jute Mesh	\$1.26	SY			\$ -
Mulch, by hand, straw, 2" deep	\$1.27	SY			\$ -
Mulch, by hand, wood chips, 2" deep **	\$3.25	SY	62.00		\$ 201.50
Mulch, by machine, straw, 1" deep	\$0.32	SY			\$ -
Piping, temporary, CPP, 6"	\$9.30	LF			\$ -
Piping, temporary, CPP, 8"	\$14.00	LF			\$ -
Piping, temporary, CPP, 12"	\$18.00	LF			\$ -
Plastic covering, 6mm thick, sandbagged	\$2.00	SY			\$ -
Rip Rap, machine placed, slopes	\$33.98	CY			\$ -
Rock Constr. Entrance 100'x15'x1'	\$3,000.00	Each			\$ -
Rock Constr. Entrance 50'x15'x1'	\$1,500.00	Each			\$ -
Sediment pond riser assembly	\$1,695.11	Each			\$ -
Sediment trap, 5' high berm	\$15.57	LF			\$ -
Sediment trap, 5' high berm w/spillway incl. riprap	\$59.60	LF			\$ -
Sodding, 1" deep, level ground	\$5.24	SY			\$ -
Sodding, 1" deep, sloped ground	\$6.48	SY			\$ -
Straw bales, place and remove	\$600.00	TON			\$ -
Hauling and disposal	\$20.00	CY			\$ -
topsoil, delivered and spread	\$35.73	CY			\$ -
<b>TOTAL</b>					<b>\$ 559.90</b>

\*\* Doubled to account for 4" mulch

GENERAL ITEMS					
ITEMS	Unit Cost	Unit			Cost
Fencing, chain link, 6' high	\$18.89	LF			\$ -
Fencing, chain link, corner posts	\$111.17	Each			\$ -
Fencing, chain link, gate	\$277.63	Each			\$ -
Fencing, split rail, 3' high (2-rail)	\$10.54	LF	224.00		\$ 2,360.96
Fencing, temporary (NGPE)	\$1.20	LF			\$ -
Signs, sensitive area boundary (inc. backing, post, install)	\$28.50	Each	4.00		\$ 114.00
<b>TOTAL</b>					<b>\$ 2,474.96</b>
<b>OTHER</b>				(Construction Cost Subtotal)	<b>\$ 6,478.36</b>
ITEMS	Percentage of Construction Cost	Unit			Cost
Mobilization	10%	1			\$ 647.84
Contingency	30%	1			\$ 1,943.51
<b>TOTAL</b>					<b>\$ 2,591.34</b>
<b>MAINTENANCE AND MONITORING</b>					
NOTE: Projects with multiple permit requirements may be required to have longer monitoring and maintenance terms. This will be evaluated on a case-by-case basis for development applications. Monitoring and maintenance ranges may be assessed anywhere from 5 to 10 years.					
<b>Maintenance, annual (by owner or consultant)</b>					
Less than 1,000 sq.ft. and buffer mitigation only	\$ 1.08	SF		(3 X SF total for 3 annual events; Includes monitoring)	\$ -
Less than 1,000 sq.ft. with wetland or aquatic area mitigation	\$ 1.35	SF		(3 X SF total for 3 annual events; Includes monitoring)	\$ -
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of buffer mitigation	\$ 180.00	EACH	3.00	(4hr @\$45/hr)	\$ 540.00
Larger than 1,000 sq. ft. but less than 5,000 sq.ft. of wetland or aquatic area mitigation	\$ 270.00	EACH		(6hr @\$45/hr)	\$ -
Larger than 5,000 sq.ft. but < 1 acre -buffer mitigation only	\$ 360.00	EACH		(8 hrs @ 45/hr)	\$ -
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area mitigation	\$ 450.00	EACH		(10 hrs @ \$45/hr)	\$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area mitigation	\$ 1,600.00	DAY		(WEC crew)	\$ -
Larger than 5 acres - buffer and / or wetland or aquatic area mitigation	\$ 2,000.00	DAY		(1.25 X WEC crew)	\$ -
<b>Monitoring, annual (by owner or consultant)</b>					
Larger than 1,000 sq.ft. but less than 5,000 wetland or buffer mitigation	\$ 720.00	EACH	3.00	(8 hrs @ 90/hr)	\$ 2,160.00
Larger than 5,000 sq.ft. but < 1 acre with wetland or aquatic area impacts	\$ 900.00	EACH		(10 hrs @ \$90/hr)	\$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area impacts	\$ 1,440.00	DAY		(16 hrs @ \$90/hr)	\$ -
Larger than 5 acres - buffer and / or wetland or aquatic area impacts	\$ 2,160.00	DAY		(24 hrs @ \$90/hr)	\$ -
<b>TOTAL</b>					<b>\$ 2,700.00</b>
<b>Total</b>					<b>\$11,769.70</b>