

**MITIGATION BANKING INSTRUMENT  
SKYKOMISH HABITAT MITIGATION BANK:**

**APPENDIX 1**

*Establishment and Operation of Phase One of the  
Skykomish Habitat Mitigation Bank*



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# Appendix 1: Skykomish Habitat Mitigation Banking Instrument

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## **Executive Summary**

Skykomish Habitat, LLC (Skykomish Habitat), in cooperation with Federal, State, Local, Tribal and other stakeholder interest groups have developed this Appendix to the Mitigation Bank Instrument (Instrument) for the purpose of establishing Phase 1 of the Skykomish Habitat Mitigation Bank (Bank). This Instrument was developed through an interagency Mitigation Bank Review Team (MBRT) and describes in detail all of the required elements for the establishment, use and operation of Phase 1 of the Bank. This Appendix to the Mitigation Banking Instrument provides the site-specific implementation procedures, detailed parameters, objectives, and performance standards for the Bank. In addition to this Instrument, Skykomish Habitat is also required to obtain and comply with all of the required permits and approvals associated with a project proposal of this kind, and to secure an agreement with an Easement Holder who will hold a Conservation Easement on the Bank property in perpetuity.

The Bank offers a unique opportunity for “process-driven” restoration because of its landscape position within the watershed on the dynamic floodplain of the Skykomish River. The overall property consists of 260 +/-acres, of which approximately 172 acres are hereby approved under this Instrument as Phase 1 of the Bank. The design was developed in response to environmental and ecological needs identified within the lower reach of the Skykomish River. After it is constructed the Bank will address many of these needs. The controlled breach and/or removal of portions of the lower end of a perimeter flood control dike will provide flood relief to neighboring farmland. Restoration of a stream channel and riparian complex will restore dynamic river processes and create off-channel and side channel rearing habitat for threatened and endangered salmonids. The expanded floodplain wetland areas will provide additional flood storage capacity and support aquatic habitat by extending and linking critical areas into a dynamically-functioning floodplain wetland and channel complex that supports a broad suite of functions and values. The resulting environmental functions and values from implementation of the Bank are ideally suited to serving as advance compensatory mitigation for projects located within the Bank’s service area.

The primary goal of the Bank is to generate compensatory mitigation credits for use within the Bank service area. Mitigation credits are generated through demonstration by Skykomish Habitat that the Bank has met the required performance standards under this Appendix. The overall ecological goal of the Bank is to restore, rehabilitate and enhance wetlands and salmonid habitat through the creation of a floodplain wetland complex and braided side channel complex along the north bank of the Skykomish River, approximately 2.5 miles upstream of the Snohomish River.

Required information to support the establishment and operation of Phase 1 of the Bank relating to project design, construction plans, functions and values performance standards, maintenance, monitoring and reporting requirements, bank credits, guidance on ratios for exchange and transfer, service area and long-term management are contained within this Appendix to the Instrument.

## **1 Introduction**

Section 404 of the Clean Water Act (CWA) (33 USC 1344 et seq.) and Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) authorize the Department of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into waters of the United States, including wetlands and other special aquatic sites, and for activities in, or affecting, navigable waters of the United States. The Department of the Army, through its U. S. Army Corps of Engineers (Corps) Regulatory Program, makes decisions to issue or deny permits based on a public interest review (33 CFR Parts 320-331) and, for activities subject to regulation under Section 404, in compliance with the U.S. Environmental Protection Agency's (EPA) "Guidelines for the Specification of Disposal Sites for Dredged and Fill Material" (40 CFR Part 230), known as the section 404(b) (1) guidelines.

The Washington Department of Ecology (DOE) regulates wetlands under the State Water Pollution Control Act and the Shoreline Management Act and provides technical assistance to other agencies that regulate wetlands under separate statutes, such as the Hydraulic Code (Washington Department of Fish and Wildlife). In addition, DOE provides technical assistance to local governments under the Growth Management Act. The DOE and other state agencies use the State Environmental Policy Act (SEPA) process as a mechanism to identify potential wetland-related concerns early in the permitting process.

These government agencies generally require mitigation for adverse impacts to the aquatic environment associated with regulated activities. The Council on Environmental Quality has defined mitigation to include avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts. For those impacts that remain after taking appropriate steps to avoid and minimize adverse impacts, appropriate and practicable compensatory mitigation is required to offset those remaining unavoidable impacts. Compensatory mitigation includes restoring, enhancing, creating or preserving the aquatic system functions that would be lost or impaired due to an authorized activity. Compensatory mitigation may be implemented to offset the adverse impacts of one or more authorized projects within a single consolidated mitigation project. Consolidated mitigation projects, such as mitigation banks, may result in greater overall environmental benefit than those achieved with numerous small, individual mitigation projects and are usually more cost-effective to implement.

Guidance pertaining to the type and extent of mitigation that may be required by the Corps is provided in the February 6, 1990, "Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act 404(b) (1) Guidelines." This memorandum of agreement also emphasizes the importance of a national goal to achieve an overall no net loss of the nation's remaining wetlands base and notes, without providing further guidance, that mitigation banking may be an acceptable form of compensatory mitigation under certain conditions.

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On November 28, 1995, six federal agencies jointly issued detailed guidance, “Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks,” that details how mitigation banks can be used to satisfy the mitigation requirements of the Section 404(b)(1) guidelines. This federal guidance defines mitigation banking as the restoration, enhancement, creation, and in exceptional circumstances, preservation undertaken to compensate in advance and at one location for adverse impacts to the aquatic ecosystem. Mitigation banking can be an appropriate form of compensatory mitigation when other forms of mitigation cannot be practically achieved at the impact site or would not be as environmentally beneficial. Many federal, state and local agencies recognize that mitigation banking can benefit the aquatic ecosystem, as well as permit applicants, regulatory and natural resource agencies, and the general public.

The Washington Department of Ecology by order of the State Legislature has developed a set of draft Mitigation Banking regulations. In the 2004 legislature the DOE was authorized to start a mitigation bank pilot program to evaluate the draft rules. The Skykomish Habitat Mitigation Bank is part of the DOE mitigation bank pilot program.

Snohomish County through SCC 30.62.375 of the Unified Development Code allows for wetland mitigation banking when approved by the Director of Planning and Development Services, in accordance with the criteria set forth in SCC 30.62.375 subsection 2 to provide wetland mitigation as required by SCC 30.62 for impacts to critical areas and buffers.

King County, through administrative rules codified in King County Code (KCC) 21A.24.345, established the criteria governing the creation and use of wetland mitigation banks in the county to compensate for unavoidable impacts to wetlands, in accordance with the Metropolitan King County Council's directive.

The Federal, State and Local agencies that participated in the development of this Mitigation Bank Instrument (Instrument) are hereafter referred to as the Mitigation Bank Review Team (MBRT).

Skykomish Habitat, LLC, (“Skykomish Habitat”) sponsor of the Skykomish Habitat Mitigation Bank (Bank), proposes to develop a mitigation bank through the restoration, creation, and enhancement of wetlands, streams, and riparian habitat on 172 acres in Phase 1 located in Snohomish County Washington to generate marketable wetland mitigation credits. The Phase 1 Bank site is located along the Skykomish River near the City of Monroe, Washington approximately 2.5 miles upstream of the confluence of the Skykomish, Snoqualmie and Snohomish Rivers. Historic and current land use on the site has been primarily agricultural. The site hosts a limited amount of natural habitat along the boundaries adjacent to the river and the forested slopes located to the west and north of the site. The general ecological goals of the Bank site are contained below in Section 4.

The total property acreage is +/- 260 acres. However Skykomish Habitat proposes to develop only 172 acres, to be known as Phase 1, at this time; Skykomish Habitat may

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develop the remaining 88 acres as a future Phase 2 project. Phase 1 will be implemented in two stages: a 98.4-acre Phase 1A and a 73.6-acre Phase 1B, slated for construction one year later. Hereinafter, the term “Phase 1” will be used to refer to Phases 1A and 1B collectively.

### **2 Legal Authorities**

This Bank is established in consideration with the following federal and state statutes, regulations, guidelines, and policies:

- Clean Water Act (33 USC 1251 et seq.)
- Regulatory Programs of the Corps of Engineers (33 CFR Parts 320-331)
- U.S. Army Corps of Engineers Regulatory Guidance Letters 02-2, and 05-1
- Guidelines for the Specification of Disposal Sites for Dredged and Fill Material (404(b)(1) Guidelines, 40 CFR Part 230)
- Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines (February 6, 1990)
- Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks (November 28, 1995)
- National Environmental Policy Act (42 USC 4321 et seq.)
- Council on Environmental Quality Procedures for Implementing the National Environmental Policy Act (40 CFR Part 1500-1508)
- Executive Order 11990 (Protection of Wetlands)
- Executive Order 11988 (Protection of Floodplains)
- Executive Order 13112 (Invasive Species)
- Fish and Wildlife Coordination Act (16 USC 661 et seq.)
- Fish and Wildlife Service Mitigation Policy (46 FR 7644-7663, 1981)
- Endangered Species Act (16 USC 1531 et seq.)
- Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq.)
- National Historic Preservation Act, as amended (16 USC 470)
- State of Washington Mitigation Banking Statute (RCW 90-84)
- Washington State Environmental Policy Act (‘SEPA’ RCW 43.21C and WAC 197-11)
- Growth Management Act (RCW 36.70A) and Critical Areas Regulations “Best Available Science” compliance WAC 365-195-900 to 925)
- SEPA/GMA Integration
- Washington State Water Pollution Control Act (RCW 90.48)
- Washington State Hydraulic Code (RCW 75.20 and Hydraulic Permit Approval)
- Washington State Shoreline Management Act (RCW 90.58, WAC 173-200 as amended)
- Washington State Salmon Recovery Act (RCW 75.46)
- Washington State Alternative Mitigation Policy, developed by Ecology, Washington State Department of Transportation (WSDOT), Washington

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Department of Fish & Wildlife (WDFW), and the Office of Community Development (OCD), 2000

- Washington State Aquatic Resources Act (RCW 79.90, RCW 90.74)
- Wetlands Mitigation Banking (RCW 90.84)
- Washington State’s Draft Rule on Wetland Mitigation Banking (WAC 173-300, Compensatory Wetland Mitigation Banking)
- Snohomish County Critical Areas Code, General Policy Plan, Shoreline Management Substantial Development Program, and Unified Development Code
- King County Sensitive Areas Ordinance (SAO) Title 21A.24.345
- King County Wetland Mitigation Banking Regulations (PUT 8-11, 1999)

Nothing in this Instrument shall be construed as altering the requirements of, and agency responsibilities pursuant to, these laws, regulations, and policies.

### **3 Scope of Agreement**

This Appendix to the Mitigation Banking Instrument (Instrument), which was prepared in accordance with the “Federal Guidance for the Establishment, Use and Operation of Mitigation Banks,” shall serve as the detailed implementation plan for the establishment and operation of Phase 1 of the Bank. The terms and provisions of this Appendix are incorporated by reference into the Basic Agreement that, together with this Appendix, will constitute the Mitigation Banking Instrument (“Instrument”) that will govern the relationship between Skykomish Habitat and the regulatory agencies having jurisdiction over, and/or substantial interest in the Bank. This Instrument will also serve as the “Memorandum of Agreement” and “Implementation Manual” per Snohomish County regulations and, when combined with the initial Bank prospectus, As-Built Report, and Performance Monitoring Reports, shall constitute the “Implementation Plan” per King County Regulations.

The following agencies participated in the development of the Skykomish Habitat Mitigation Bank:

- U.S. Army Corps of Engineers, Seattle District (Corps)
- U.S. Environmental Protection Agency (EPA)
- U.S. Fish & Wildlife Service (USFWS)
- National Oceanic & Atmospheric Administration – Fisheries Division (NOAA-Fisheries)
- Washington State Department of Ecology (Ecology)
- Washington State Department of Fish & Wildlife (WDFW)
- Washington Department of Natural Resources (WDNR)
- Snohomish County (SC)
- King County (KC)
- Tulalip Tribes of Washington (Tulalip)

## **4 Ecological Goals of the Bank**

The primary ecological goal of the Bank is to restore, rehabilitate and enhance wetlands and salmonid habitat through the creation of a floodplain wetland complex and braided, side channel complex along the north bank of the Skykomish River, approximately 2.5 miles upstream of the confluence of the Skykomish, Snoqualmie and Snohomish Rivers for the purposes of establishing the compensatory mitigation bank. The Bank includes the following primary habitat goals:

- Optimize the ecological functions of the site by creating an integrated dynamic system of wetlands and river side channels;
- Increase the area and function of riparian and floodplain wetlands and riparian area adjacent to the restored channels;
- Rehabilitate and enhance the existing on-site wetlands to provide floodplain wetlands that support the restored salmonid habitat;
- Maximize juvenile salmonid habitat throughout the project area by restoring natural function to existing, remnant side channels and increasing the area of this channel complex;
- Avoid negative impacts to existing habitats, sensitive areas (i.e. Critical Areas), and neighboring properties.

The purpose of the Bank is to generate mitigation credits for projects that will have an adverse impact on the aquatic environment and need to compensate for those impacts as a condition of their permits or other regulatory requirements resulting from project impacts. Impacts that could be compensated for by the Bank include those to wetlands, streams, essential fish habitat, critical areas and buffers.

## **5 Site Location, Rationale for Site Selection, and Site Ownership**

The Phase 1 Site is located along the north bank of the Skykomish River in Sections 11 and 14, Township 27 North, Range 6 East, in Snohomish County. Phase 1 is located directly south of Monroe, approximately 2.5 miles upstream from the confluence with the Skykomish, Snoqualmie and Snohomish Rivers. The site is situated at the end of 177<sup>th</sup> Avenue SE, landward of the Hansen Dike. The site is owned in undivided fee-simple interest by Skykomish Habitat, LLC, the project Sponsor, and consists of the 172 contiguous acres divided into two areas, Phase 1A (98.4 acres) and Phase 1B (78.6 acres). Figure 13 contains the detailed site survey and legal description for the property and Phase 1 boundary line.

The Bank has been developed as a direct result of the recognition that this particular property presents a unique opportunity for large-scale ecological restoration. The Phase 1 project will fill an ecological need that has been identified by local scientists, academics, government agencies, and regional planning and technical groups to restore off-channel and side channel habitat in the lower Skykomish River basin. This project

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offers a rare opportunity to actively restore natural function to a large parcel of riverside property and conserve it in perpetuity as a part of a mitigation bank. The project design is primarily based upon the “Ascent 21” project proposal generated by Snohomish County’s Department of Surface Water Management which had identified this property, in particular, for acquisition for the purpose of creating breaches to the flood control dike and creating off-channel habitat for juvenile salmonids. In addition, Skykomish Habitat proposes to enhance, create or restore floodplain wetlands within the project area. Some of these areas were historically wetlands and contain remnant wetland features suggesting that they could be restored effectively. Through restoration and enhancement of these critical areas, the overall ecological lift resulting from the project is significantly increased as hydrologically connected floodplain wetlands are vital to the proper function of the restored channel network. As such, the existing on-site conditions suggest that this type of restoration proposal to include a greatly expanded floodplain wetland component is a natural extension of the channel network design. The functional mosaic that would result optimizes ecological benefits associated with potential restoration activities.

This Instrument provides a vehicle for the Sponsor to initiate the County’s plan and realize an economic return. The project will be completed in the context of multiple other restoration efforts currently underway in the watershed or planned for the future. (See also Figure 15 showing the location of some of these other projects occurring within the watershed).

- Snohomish River confluence reach restoration (Snohomish County, SRF Board)
- Skykomish River braided reach restoration assessment (Snohomish County, SRF Board)
- Haskell Slough restoration (Monroe)
- Riley Slough restoration (Monroe)
- Kissee Creek restoration (Monroe)
- Woods Creek Falls protection and restoration (Sultan)
- Snohomish Basin Mitigation Bank; and
- Fox Creek Restoration

## **6 Existing Site Conditions**

The property is bordered on the south and east by the Skykomish River, to the west by a 100- to 300-foot-tall escarpment, and to the north by livestock pasture. The only buildings on the property are clustered toward the east end of the site, and are not within the Phase 1 area. Existing structures consist of a residence, barns and small outbuildings associated with the site’s former use as a dairy farm and are located near the northeast boundary of Phase 1B. Approximately 75% of the property is flat and open and is used for periodic agriculture and recreational facilities including dirt bike (off road motorcycle) track, soccer fields, baseball fields and a picnic area. Construction of Phase 1 would eliminate the soccer fields, dirt bike track and picnic area and some of the existing agricultural buildings to accommodate construction activities. These activities and facilities would not be re-located to other areas of the property.

### 6.1 Palustrine Wetlands

Of the four palustrine wetlands on the property described in the Wetland Delineation Report and the Basis of Design Report (see References), only two palustrine wetlands (Wetlands 1 and 3 in the table below, and shown on Figure 2) are within the boundaries of the project areas for Phase 1. Riverine wetlands R1 (within Phase 1 boundary) and R2 (located near Phase 1 boundary, but not within area owned by Skykomish Habitat) are located within the existing and proposed riparian/channel complex and will be discussed in Section 6.2 (B) below.

Table 1. Summary of Existing Wetland Characteristics within Phase 1

Wetland	Size (acres) <sup>1</sup>	Classification <sup>2</sup>	Snohomish County Rating <sup>3</sup>	Washington State Rating <sup>4</sup>
1	26.4	Palustrine scrub-shrub Palustrine emergent Palustrine aquatic bed Palustrine open water	Category 1	Category I
3	0.6	Palustrine emergent Palustrine aquatic bed Palustrine scrub-shrub Palustrine open water	Category 3	Category II
R1	2.5	Riverine, lower perennial	Category 3	Category III

1 Estimated area in acres based on partial boundary delineation and aerial photograph interpretation

2 Wetland vegetation classification based on the USFWS classification system (Cowardin et al. 1979)

3 Rating based on criteria in Section 30.62.300 of the Snohomish County Code

4 Rating based on criteria in Washington State Wetland Rating System for Western Washington (August 2004)

Wetland 1 is approximately 26.4 acres in size and consists primarily of a disturbed palustrine emergent (PEM) vegetation class dominated by non-native grasses and herbs. Portions of this PEM have been plowed in recent years during ongoing farming activities. Large portions of the PEM are covered with reed-canarygrass (*Phalaris arundinacea*). Dominant plants in smaller areas of the PEM include small-fruited bulrush (*Scirpus microcarpus*), creeping buttercup (*Ranunculus repens*), colonial bentgrass (*Agrostis capillaris*), and broad-leaf cattail (*Typha latifolia*). The lack of structural complexity in the PEM portions of the wetland results in very limited wildlife habitat, floodwater control, and water quality functions.

The wetland also contains small areas of scrub-shrub (PSS), and aquatic bed (PAB) vegetation classes, and very small areas of open water. The PSS is dominated by Sitka willow (*Salix sitchensis*), salmonberry (*Rubus spectabilis*), peafruit rose (*Rosa pisocarpa*), and black twinberry (*Lonicera involucrata*). The small areas of PSS function at a moderate level for wildlife habitat, primarily for songbirds. The wildlife habitat and water quality functions are limited by small size and scattered distribution of the scrub-shrub areas. The dominant plants in the PAB include yellow pond-lily (*Nuphar luteum* ssp. *polysepalum*), water ladysthumb (*Polygonum amphibium* var *stipulaceum*), and different leaved starwort (*Callitriche heterophylla*). The PAB areas are small but provide good habitat for resident fish, waterfowl, amphibians, and insects. Wetland 3, which

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functions within the Riparian/Channel Complex zone and Riverine wetland R1 are further discussed in Section 6.2.

### Functional Assessment Scores for Existing Wetlands

The Washington State Wetland Functional Assessment Method (WAFAM) (Hruby et al., 1999) was used to evaluate the functions of existing wetlands within the areas planned for enhancement activities. The assessment results for Wetlands 1 and 3 are shown as index numbers in the table below. The sum of the scores for each variable measured are normalized to a scale of 0 to 10 for each function and represent a per-acre score. For purposes of this evaluation, a low score is 0 to 3, a moderate score is 4 to 6, and a high score is 7 to 10. The opportunity column shows a qualitative judgment about the opportunity the assessment unit has to perform certain functions. These pre-construction baseline functional assessments will be used as a benchmark for evaluating future functional lift derived from the creation of proposed wetlands and the enhancement of existing wetlands. Existing wetlands will be evaluated based on the functional lift derived from enhancement activities, while created wetlands will be evaluated based on their function relative to their pre-construction state.

**Table 2. WAFAM-based Wetland Functional Assessment Results for Phase 1**

Function	Wetland 1		Wetland 3	
	Index	Opportunity	Index	Opportunity
Removing Sediment	6	Moderate	8	Moderate
Removing Nutrient	5	Moderate	6	Moderate
Removing Toxics	7	Low	5	Low
Reducing Peak Flows	7	Moderate	8	Moderate
Decreasing Erosion	6	Low	4	Low
Recharging Groundwater	4	Low	9	Low
General Habitat Suitability	7	Moderate	4	Moderate
Invertebrates	7	-	3	-
Amphibians	5	-	5	-
Anadromous Fish	7	Low	7	High
Resident Fish	6	-	6	-
Birds	6	-	7	-
Mammals	7	-	7	-
Native Plant Richness	3	-	1	-
Productivity and Export	5	-	4	-

Most of the functions that scored in the moderate range were limited by the large portions of the wetland that are dominated by reed canarygrass and the limited cover of woody plant species. This low structural diversity in the plant community limits the bird habitat and sediment removal functions. The small amount of area with thin-stemmed emergent vegetation limits the amphibian habitat score. Native plant richness received a low score because of the dominance of non-native weeds throughout much of the wetland and the small number of native species present.

## **6.2 Riparian/Channel Complex (Channel Migration Zone)**

The existing riparian/side channel complex is an area that is episodically flooded by the river and contains a mosaic of aquatic and riparian habitats. The current side channels and off channel areas throughout the project reach are remnants of what they once were. Levees upstream and directly across from the project area limit the migration potential of the channel and alter sediment movement and deposition patterns within the project area. Accumulated gravel deposits at the upstream and downstream ends of the side channel area limit access to off channel areas to approximately the 2-year flood event on the Skykomish River. This has led to decreased periods of thru-flow throughout the side channels, less flushing of accumulated sediments, limited access for juvenile salmonids seeking low velocity refugia, reduced habitat complexity and increased presence of invasive plant species.

The various habitats that are currently provided within the side channel area consist of a small palustrine wetland (Wetland 3), a small riverine wetland (R1), side channels, off channel areas and mesic riparian forests. The elevation and proximity of this area to the river allow for periodic movement of the river channel and side channels over time. The dynamic physical process of channel migration is reflected in the diverse and interconnected habitats and ecological processes that occur in this zone. The various aquatic resource areas within the Riparian/Channel Complex are described below.

### **A. Near-channel riparian zones**

In the context of the Bank, near-channel riparian zones are the sloped areas adjacent to the side channels that support riparian vegetation but do not meet the definition of wetlands. This zone is bounded by the top of bank and the edge of each channel, or channel side slope. The riparian areas provide essential functions for adjacent open water areas, such as increased shade to reduce thermal input, flood conveyance, insect and organic material input, bank cohesion and sources of large woody debris (LWD). Large portions of this existing near-channel riparian zone have patches of exotic knotweed. Although this plant may provide a small amount of shade it can reduce available wildlife habitat, increase bank erosion, and interrupt the cycle of forest regeneration and thereby decrease the available supply of LWD.

### **B. Riverine Wetlands**

Wetland R1 is an area of riverine wetlands that is on one of the large gravel bars within the existing riparian/channel complex. The hydrology in these wetlands is driven by the river and the dynamic environment within the channel continually reshapes the boundaries and vegetation in these wetlands. The dominant plants in these wetlands are red alder (*Alnus rubra*), Sitka willow (*Salix sitchensis*), reed-canarygrass (*Phalaris arundinacea*), black cottonwood (*Populus balsamifera*), and Japanese knotweed (*Polygonum cuspidatum*).

Wetland 3 is small in size (0.6 acres) and is near the river along the edge of the existing riparian/channel complex. The wetland is approximately 50 percent open water, 20 percent PEM, 10 percent PAB, 10 percent PSS, and 10 percent un-vegetated gravel bar. Dominant plants include black cottonwood saplings, reed canarygrass, red alder, exotic

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knotweed, and mild waterpepper (*Polygonum hydropiperoides*). The permanently ponded area (approximately 2 feet deep) of the wetland is a result of high groundwater.

Wetland 3 is classified as a depressional outflow wetland and is occasionally flooded by the river. The wetland received moderate scores for most functions including removing toxics, removing nutrients, decreasing erosion, general habitat suitability, amphibian habitat, resident fish habitat, and productivity and export. A low score was given for native plant richness and invertebrate habitat. High scores were received for removal of sediments, reduced peak flows, groundwater recharge, anadromous fish habitat, bird habitat, and mammal habitat. Although this wetland is small the high scores for wildlife habitat functions are a result of the direct connections to the riparian corridor and the occasional surface water connection to the river.

### **C. Channels**

Side channels in the project area have a direct connection to the Skykomish River during flows that approximate the 2-year flow event, calculated at 42,000 cfs. This correlates to a water surface elevation of approximately 44 ft (NAVD 88). At flows below this elevation, hyporheic flows and shallow groundwater discharge provide water to areas within the side channel complex. Isolated pools retain water throughout the entire year and cool water temperatures are maintained by hyporheic flow.

Overall gradient of the existing side channels is 0.1%. Bed material was collected for the purposes of a geomorphic characterization and to assist in channel design. The D50 (i.e. median grain size) of four samples collected within the side channels ranged from 9.8 to 38.1 mm. The overall median grain size was 21.7 mm, and the material is classified as sandy gravel. Overbank deposits were sampled to characterize the nature of material in future channel locations. The D50 of this sample was finer, as expected, at 0.275 mm, classified as a silty, gravelly, medium to fine sand.

Habitat complexity in the existing side channels is moderate. During high flow events when the side channels are active, they provide critical refugia for salmonids seeking low velocity holding areas. During these times, fish may utilize undercut banks and off channel pools for cover. As flows recede and the side channel is isolated from the main flow again, water is retained only in isolated pools where juvenile fish are forced to hold until a connection to the mainstem is provided again. This may last throughout the spring and summer months in a typical year, or longer in a drought year. Shade and wood are critical for thermal regulation of pools, to provide adequate cover from predators, and as a source of food from falling bugs. In addition, pools should be of adequate depth to safeguard predation from shorebirds. The site currently lacks the habitat complexity, shade, wood, and pool depth to provide summertime holding for juvenile salmonids.

### **D. Mesic Riparian Forest**

The mesic riparian forest is a transition zone between the terrestrial (upland) and aquatic (wetland and stream) ecosystems. These forests occur on the higher elevation areas in the riparian/channel complex, and they consist of primarily deciduous trees and a dense understory of shrubs. The mesic riparian forests have a shallow groundwater level for

part of the year, but not long enough to meet the jurisdictional definition of wetland. These areas are however intermittently flooded and have ecological processes similar to wetlands. The shallow groundwater and intermittent flooding create growing conditions suitable for species adapted to mesic environments and occasional soil saturation. The proximity to the river and side channels allows for a flow of material and energy into and out of these forests that provides a tight ecological connection with both the aquatic and the terrestrial zones.

The existing mesic riparian forests have a relatively mature canopy of deciduous trees with a dense understory of shrubs. The dominant trees are black cottonwood. The understory shrub layer is a mix of snowberry (*Symphoricarpos albus*) and Himalayan blackberry. Along the shoreline at the edge of these forests are patches of exotic knotweed. The mesic riparian forests provide habitat for many resident and migratory birds, and small mammals. The large trees provide nesting and roosting opportunities for many raptors, and provide a source of LWD to the in-stream habitats. The large amount of invasive weed cover in these mesic riparian forests limits the wildlife habitat and native plant richness functions, and can have negative effects on river processes and fish habitat. Dense stands of exotic knotweed shade out and prevent the establishment of native trees and shrubs and knotweed leaf litter is nitrogen-poor, compared to native leaf litter, reducing nitrogen input to streams. If native trees are not able to establish and continually regenerate the forest, the input of LWD to the river system can be interrupted.

### **6.3 Hydrology and Hydraulics**

Hydrology of the Skykomish River is typical of rivers draining the west slope of the Cascades and flowing into the Puget Sound lowlands. The annual hydrograph consists of two peak periods, the first as a result of autumn and early winter precipitation, and the second, larger peak occurs as a result of snowmelt and rain-on-snow events during late spring.

Site-specific hydrology was determined based on a relationship to two USGS gauging stations: one on the Skykomish River at Gold Bar, approximately 14 miles upstream of the project site, and the other on the Sultan River, a major tributary of the Skykomish River located approximately 8 miles upstream of the project site. To determine the flow within the project reach, a relationship was calculated between the Sultan station and the Gold Bar station, and baseflow analysis was conducted through discrete discharge measurements within the project reach. The analysis produced an equation to describe the relationship between flows at the Gold Bar station and flows at the project site. With the addition of Sultan River flows and baseflow, it was determined that flows in the project reach typically are 17% greater than flows at the Gold Bar station. This relation was used to determine flow volumes, water surface elevations, and hydraulic parameters at the project site.

A hydraulic model was developed for the project reach using HEC-RAS, a one-dimensional steady flow model developed by the US Army Corps of Engineers for river analysis. Results of the hydraulic analyses were used to determine the water surface elevations of various flood events, including the 1, 2, 10, 25, 50, and 100 year flood

events. Hydraulic parameters were also determined for use in the design of stream channels, such as stream power and shear stress, which are used to estimate sediment transport within the reach.

**6.4 Soils**

The entire property is relatively flat within the site boundaries. According to the USDA/SCS Soil Survey of Snohomish County, the erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet or rill erosion by water. Based on the USDA/SCS map (Sheet 52), the soils on the property and their erosion potential are summarized in the following table:

**Table 3. Soil Types and Erosion Potential**

<b>Soil Number</b>	<b>Name</b>	<b>Range of depth variation for Erosion Factor, K</b>	<b>Susceptibility to Erosion based on the K Factor</b>
50	Pilchuck Loamy Sand	0.10 to 0.05	Low
55	Puget Silty Clay Loam	0.28 to 0.32	Moderate
56	Puyallup fine Sandy Loam	0.28 to 0.10	Moderate to Low
59	Riverwash	Not listed	Low
66	Sultan Silt Loam	0.37 to 0.32	Moderate
73	Tokul Gravelly Loam	0.28 to 0.32	Moderate
77	Tokul –Winston gravelly Loam	0.10 to 0.32	Low to Moderate

Considering the relative flatness of the property, the low to moderate erosion susceptibility, and the SCC definition of erosion hazard areas, only the toe of the slopes on the west side of the site would be considered erosion hazard areas within the property boundary.

**A. Persistent Agricultural Chemicals**

Skykomish Habitat initiated a study to determine whether any persistent agricultural chemicals may persist in soils found on the property as a result of past agricultural practices. The study involved a site reconnaissance inspection, interviews with persons having experience with or knowledge of past agricultural uses on the property and a review of federal, state, local and tribal databases. The findings indicated that there is a very low probability of the presence of persistent agricultural chemicals based on the fact that such chemicals were never used at the site. The only affirmed chemical applications at the property had been nutrient fertilizers (e.g. nitrogen, phosphorous, and potassium) which are found in the environment, serve to promote vegetative growth and health, and are not considered persistent or hazardous chemicals. Further, based on soil type and the

natural flood cycle on the site, the nutrient fertilizers introduced into the local environment would periodically be flushed out during flood events. Therefore, persistent agricultural chemicals will not pose a risk to the project or the surrounding environment in any way.

## **B. Cultural Resources**

The property has been reviewed based on current Federal and State registers of known historical sites as well as against databases maintained by the Tulalip Tribes for potential archaeological and cultural resources that may be located within the project area and may be affected by the construction of the Bank. No listed sites are found on the property. The property was also inspected by tribal representatives and Skykomish Habitat to confirm that no cultural resources are found on the property based on an additional review of three listed sites found on the adjacent property to the west. These sites are situated atop the steep bluff and well outside the limit of disturbance for Bank construction. Based on Skykomish Habitat's project location and the location and type of archaeological sites that either are or may be located on the adjoining property, it was concluded that these sites will not be disturbed as a result of the project construction. These findings were documented and submitted according to the requirements of Snohomish County Code.

### ***6.5 Vegetation - Existing Upland Communities***

Most of the existing upland area on Phase 1 is disturbed and is currently used as agricultural fields, soccer fields, dirt bike tracks, and associated dirt roads and un-paved parking areas. Very few shrubs and trees exist in the upland areas, which are dominated by non-native grasses and weeds, lawn grasses, and bare dirt in the dirt bike tracks. Himalayan blackberry (*Rubus discolor*) is the only woody plant with significant cover in most of the upland areas and it is limited to the perimeter of the dirt bike track and the eastern edge of the area planned for creation of Riparian/Channel Complex. A few Douglas fir (*Pseudotsuga menziesi*) trees also occur in this area.

Ecological functions in these disturbed upland areas are limited. The dirt bike tracks have very little if any vegetation and do not provide any significant wildlife habitat or hydrologic functions. The areas being used as soccer fields and agricultural fields likely provide some hunting habitat for red-tailed hawks and the field mice, rabbits, and snakes that are among their prey species. These areas are also likely occasionally used as foraging habitat for some birds (i.e. crows, gulls). Portions of the agricultural fields are flooded by the river during high flow events. This area provides a small degree of temporary floodwater storage, but the lack of woody and persistent herbaceous vegetation precludes significant floodwater attenuation and water quality functions.

A small portion of the upland area on the site has a relatively mature mixed coniferous-deciduous forest. The forest extends along the entire western property boundary and includes the area from the base of the slope to the top of the steep escarpment. Dominant trees include big-leaf maple, western red cedar, and red alder. This area has excellent wildlife habitat and provides a highly functional buffer area for the existing wetland.

Most of this forested upland is on an adjacent property, but 4.5 acres will be included in the Bank and dedicated as Slope Preservation Area.

### ***6.6 Threatened and Endangered Species***

The Biological Evaluation prepared for Phase 1 documents existing habitat on site for species listed as threatened or endangered that may occur within the Phase 1 project area. The endangered, threatened, and former candidate species that may occur within the vicinity of the project include Chinook salmon, Coho salmon, bull trout, and bald eagle. Phase 1 contains habitat for juvenile salmonids within the existing channel network on the southeastern portion of the property; however, this habitat is limited in extent to the very southern portion of the property along the margin of the Skykomish River. Very little Chinook salmon spawning occurs in the reach of the lower Skykomish River located along the project area. This reach of the river has been observed to be utilized more heavily by spawning pink salmon and chum salmon. Two bald eagle nests have been reported within a mile of the project site by the WDFW Priority Habitats and Species Program.

## **7 Mitigation Bank Design**

Skykomish Habitat developed a detailed Basis of Design Report (see References) that contains detailed information used to generate this Appendix. At the onset of the design it was recognized that in river and floodplain environments, habitat features are the natural result of the continual and episodic modification of the landscape by ongoing river processes. The habitat restoration, rehabilitation and enhancement efforts proposed in the Phase 1 design recognize this reality and create malleable habitat features in tune with the processes that will modify, destroy, and replace them over time. This view of the river system and associated wetlands guided the design.

The following design principles were used in design of Phase 1:

**Sustainability** – The system should be built to last and sustain itself without artificial maintenance. When restoring or creating habitat, the habitat features must fit within the context of the habitat-forming process.

**Process Design** – The design emphasizes reestablishing geomorphic processes over constructing the desired habitat form. Therefore, the initial construction serves as a starting point or template that will provide the initial structure that will be naturally modified by ongoing processes. The art of this approach involves choosing the best starting point so that the changes associated with ongoing processes result in desirable habitat formation.

The Phase 1 design includes six habitat components (defined and mapped on Figure 3) that serve to restore the dynamic habitat forming processes suggested above. The resulting ecological mosaic will support ongoing interaction between the river, side channels, eroding banks, and floodplain wetlands. The final product of Phase 1 is an ecosystem in which the river moves and interacts freely with a network of changing side channels and a large floodplain wetland complex. Natural changes in the river will drive

processes that carve out complex habitat assemblages and associate diverse niches that adjust over time in response to ongoing river and floodplain dynamics. This type of habitat most closely mimics the function, quality, and sustainability of naturally-occurring habitats that constitute the template for the Phase 1 design.

### ***7.1 Wetland Design***

Wetland hydrology will be created by excavating the existing landscape down to grades that would intercept the underlying groundwater surface, becoming saturated for enough time to provide suitable conditions for wetland soils and plants. Wetland rehabilitation will involve minor excavation for the primary purpose of removing invasive species. The grades of the proposed wetlands were therefore designed to:

- Provide a variety of bottom elevations, which in turn provide saturation within the root zone (i.e. within 12 inches of final grade), for the appropriate hydrologic regime for different durations, but at a minimum of 30 consecutive days during the growing season. This variability in saturation duration and frequency and duration of inundation creates a diversity of wetland habitat. The grading plan creates and connects wetlands in the designated area ranging from elevations where water will be present year-round (to a minimum depth of 4 to 12 inches) to the observed highest elevation of the existing wetlands. This corresponds to Elevation 29 feet to Elevation 36 feet, respectively.
- Provide drainage grades within the wetland that would have some slope to limit the size of open water wetlands, and allow fish to escape back to the river or deeper pools during the observed rapid drop of flood waters. Minimum slopes of 0.2 percent (within wetlands) and maximum slopes of 20 percent (which would not be included within acreage counted as wetland) support created wetland areas for drainage and help limit fish entrapment.
- Minimize the amount of excavation required to create the wetlands to a target maximum of 800,000 cubic yards, and providing a sequencing regime (i.e., construct Phase 1A and then Phase 1B one year later) to correspond with the volume of material that could be moved during a given construction season (typically April through early October) which equates to approximately 400,000 cubic yards in place per phase, per year.

To meet the above elevation and sloping criteria, the Phase 1 wetland area is divided into three drainage basins as shown on Figures 3 and 3A. The southern wetland basin will discharge directly to the existing Skykomish River side channel. The middle wetland basin will discharge to the existing swale south of the existing motorcycle track, and the northern drainage basin will discharge to the existing pond, which is part of the existing Wetland 1 on the north side of the motorcycle track. The existing motorcycle track will be removed to accommodate these improvements.

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**Groundwater Modeling for Verification of the Design.** Once the preliminary design grades were established, the existing topographic surface in the groundwater model (MODFLOW) was replaced with the proposed wetland and channel topography to verify:

- The proposed wetlands will not dewater the existing wetlands contained in Table 1, and shown on Figure 2;
- Saturation within a minimum of 12 inches of the root zone will occur throughout the proposed wetland area; and
- The existing side channel and proposed channels will not dewater the proposed wetlands.

In summary, the hydrologic design of the Phase 1 wetlands is based on the groundwater modeling of the existing and proposed grades. The groundwater model for the existing conditions closely matches the measured and observed conditions in the field and it is therefore assumed that the parameters therein are accurate for simulating the impact to the groundwater and presence of wetlands within the proposed topography. Continued groundwater monitoring before, during, and after construction will be conducted to verify the modeling conclusions.

Since the primary source of water to these wetlands is from groundwater, no surface water flow control structures are expected to be necessary for the wetland creation and/or rehabilitation. Furthermore, the gradual 10 to 20 horizontal to 1 vertical slopes connecting the existing topography to the proposed wetland were designed to prevent concentration of surface water flow, causing scouring. These sloped areas will be considered upland forest for the purpose of credit determination and will be vegetated to create species diversity, and habitat complexity, and to further minimize erosion. Temporary stormwater, sediment, and erosion control structures will remain in place until plants are established throughout Phases 1A and 1B, respectively, sufficient to provide permanent protection against erosion.

**Soil.** Topsoil from within Phases 1A and 1B, respectively, that covers the existing area will be salvaged, stockpiled, and spread over the site after coarse grading has been completed. Salvaged topsoil will be screened and handled to minimize the potential for invasive species to propagate with the placement of salvaged topsoil. Based on soil composition analysis completed during the site assessment phase, there is little or no need for soil amendment. Final placement of topsoil will provide a minimum of 1 foot of loose soil to support wetland plant establishment. This will leave the surface of the wetland soils separated by a maximum of 1 foot from the groundwater-saturated surface predicted by the groundwater model. Because the existing topsoils overlie varying gradations of silty sands to gravel, and fine sediment will be washed in with flood events, a soil filter is not expected to be required at the transition between exposed native sand and gravel and placed topsoil. A wetland soil profile is expected to develop over time through groundwater upwelling, percolation after flood and rain events, and decay of organic material.

**Wetland Planting.** The planting plan was developed through reference to the species composition of nearby reference sites as the basis for determining appropriate planting assemblages for the variety of hydrologic conditions that will be included within Phase 1 wetland areas. Specific elements of the planting plan include:

- Use nearby plant communities to establish targets for planting zones
- Install plant species native to the Puget Lowlands of Western Washington
- Include multiple species to support diversity.
- Plant early seral and generalist species following excavation in Year 0, and plant shade-tolerant and later seral species in Year 3.

The type and spacing of planting types are provided in Figures 4 and 5.

## ***7.2 Riparian/Channel Complex Design***

The studies that were completed to inform the channel design include: a reach scale and basin scale geomorphic assessment, a reference reach analysis, hydrologic and hydraulic analysis, and are contained within the Basis of Design Report (see References). With the information compiled, Skykomish Habitat generated a layout of the channel locations to maximize the topography and existing stands of mature riparian forest, designed the cross sectional geometry of the channels to closely mimic existing features, designed inlet structures intended to maintain a connection to the Skykomish River at the design flows, and included other in-stream structural improvements to promote formation of pools, large woody debris (LWD) recruitment, and to create habitat diversity and complexity within the side channel zone. Details relating to channel location generally are contained within Figures 2A, 3, 3A, 3B, 4, 11, and 12, and specific design features are contained within Figures 6, 7, 8, 9, and 10.

The main objective of the side channel restoration and creation within the Riparian/Channel Complex is to provide off channel rearing habitat for salmonid species in the Skykomish River drainage. These areas will be improved by restoring and enhancing the function of the side channels through lowering the invert elevation of created channels and allowing greater access of flows to the site, as well as excavating additional channels to add more potential habitat area, and providing improved riparian vegetation within the riparian/channel migration zone. Once complete, the side channels will provide abundant general wildlife and salmonid habitat in off-channel areas at critical times of the year. The channels will be subject to dynamic processes which will benefit salmonids and other aquatic species by creating habitat complexity, recruiting large woody debris, and forming deep scour pools for summertime refugia

The channel design incorporates erodible channel boundaries and creates a dynamic channel network subject to frequent shifting, braiding, and recruitment of LWD. Existing landscape features, such as mature stands of cedar and cottonwood trees, will be preserved in place to provide immediate shade to the channel and a source of large trees for potential LWD recruitment. The inlet configuration will also allow for the natural ebb and flow of sediment into and through the side channels while preventing excessive

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sediment deposition or excessive scour. Inlet areas will be oriented to encourage LWD accumulation on the downstream edge of the inlet area.

Side channels will be made more attractive to juvenile salmonids by installing habitat features such as LWD accumulations, cover, shade, and appropriate substrate (i.e., less than 12% fines which are <0.85mm by weight (sieve analysis) in gravel). In-stream structures are designed to maximize habitat complexity. High flow events will create scour pools around structures with sufficient depth to provide cover from predation throughout the summer months. Channel migration and scour will be influenced by habitat structures encouraging natural recruitment of LWD from the stream banks through bank erosion and formation of undercut banks. The in-stream structures will provide high-quality off-channel habitat for juvenile salmonids during high-velocity flow events and during low-flow periods.

**River Modeling for Verification of Design.** Layout of channel geometry was conducted to mimic natural side channel geometry seen on the lower Skykomish River. The side channel invert elevations were determined by setting a design flow to achieve the desired flow frequency and timing and using the HEC-RAS model (See Table 4 below) to determine the water surface elevation that corresponds to the design flow. Channel layout and cross section configuration also account for sediment transport.

Hydraulic analyses included channel geometry studies, tractive force analysis, and particle size analysis. The results were used to aid in the determination of channel dimensions (slope, top-width, side-slopes), determine the critical shear stress required to mobilize the dominant sediment size (incipient motion analysis) available in the side channels, and determine the depth of bed scour at critical design features, such as channel inlets.

Side channel inlets will be in direct contact with the mainstem Skykomish River and therefore subject to large flow velocity, debris accumulation, and sediment deposition. The design of the side channel inlets is a critical part of establishing and sustaining a functioning side-channel network. The inlets will maintain an upstream connection to the Skykomish River during specific flood intervals and events as well as critical life stages of rearing juvenile salmonids, particularly Chinook and Coho salmon. Historical flow data from USGS station in the past 75 years was used to determine the design flow such that there will be an upstream and downstream connection of the channels to the Skykomish River during these events. Based on this historical data, a design flow of 3,500 cubic feet per second was used to determine the invert elevation of the proposed side channel.

The HEC-RAS analysis determined the total volume of flow that will enter the side channel complex under various flood events. Table 4 presents that portion of total flow which is expected to flow through the side channels at various events. Table 4 shows that the water surface elevation is expected to drop up to a maximum of 2.3 ft at the 10 year flow. The effects of the water surface reduction will not attenuate downstream as the great majority of waters entering the side channels will re-enter the mainstem Skykomish downstream of the project reach.

Table 4. HEC-RAS Results for Channel Complex

Return Interval	Discharge (cfs)			Water Surface Elevation (ft)	
	Skykomish River	Mainstem	Side Channel	Existing	Proposed
1 year	15,000	12,021	2,979	38.2	37.4
2 year	42,000	32,374	9,627	43.8	42.2
10 year	82,000	62,765	19,235	48.1	45.8
50 year	122,000	94,272	27,728	49.5	48.1
100 year	138,000	106,781	31,219	50.1	49.1

### 7.3 Erosion and Sediment Control

Due to the close proximity of earthwork to the Skykomish River, management of stormwater runoff, erosion, and sediment associated with site development activities is critical to the successful implementation of Phase 1. Phase 1 will be constructed to meet Ecology’s water quality standards contained in WAC 173.201(A) through the implementation of an approved Stormwater and Erosion Control Plan (SECP). The SECP developed for the construction of Phase 1 construction of the Bank is contained in the Basis of Design Report as Appendix G (see References) and complies with the Ecology Water Quality Program’s “*Stormwater Management Manual for Western Washington*” (Ecology, 2005, and *Snohomish County’s Addendum to the 1992 Ecology Stormwater Management Manual for the Puget Sound Basin, Volumes I-IV* (Snohomish County, 1998). The objectives of the SECP are:

- Prevent loss of soil from the site during construction activities;
- Comply with local, state, and federal water quality requirements pertaining to sediment/turbidity; and
- Manage in-water work to prevent turbidity impacts to aquatic resources.

In general, Phase 1 will use a series of temporary detention and filter berms as well as silt fences during and after construction to protect water quality for aquatic life uses as defined in WAC 173-201A-200(1). Temporary stormwater, sediment, and erosion control structures will remain in place until plants are sufficiently established to provide permanent protection against erosion.

Additional considerations for drainage and runoff are contained in the Targeted Drainage Plan (see References) submitted to Snohomish County as part of the project application.

## 8 Post-Construction Conditions

When Phases 1A and 1B are complete a dynamic environment encompassing the mainstem Skykomish River, associated riparian/channel complex, palustrine floodplain wetlands, riverine wetlands, and forested uplands will support high quality habitat for wildlife including endangered salmonids at various life stages, amphibians, birds,

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mammals, insects, and microorganisms. The restored, created, rehabilitated and enhanced habitats will support a wide array of ecological functions and values that will be appropriate for use to compensate for lost functional value associated with permanent impacts to other aquatic resources.

Table 5 below presents the proposed Phase 1 acreage for each of the project's habitat components by activity type, the nature of the work to be performed (discussed above) and the anticipated functions and values that are expected to result.

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Table 5. Proposed Phase 1 Habitat Improvement Activity and Anticipated Functions

Habitat Component	Phase 1A Area	Phase 1B Area	Total Phase 1 Area	Habitat Improvement Activities	Cumulative Anticipated Functions
Wetland Rehabilitation	14.9	5.5	20.4	<ul style="list-style-type: none"> <li>- Invasive species removal and management</li> <li>- Limited grading to improve hydrology and connect to adjacent habitat components.</li> <li>- Installation of wetland plants</li> <li>- Placement of large woody debris piles and small brush piles to create habitat features</li> </ul>	<ul style="list-style-type: none"> <li>- Removal of sediment, nutrients and toxics</li> <li>- Flood water storage (reduce peak flows and erosion)</li> <li>- Groundwater recharge (wetlands connected directly to hyporheic zone of Skykomish River)</li> <li>- General habitat suitability (wetlands fit in this context of this floodplain zone along the Skykomish)</li> <li>- Habitat for: invertebrates, amphibians, anadromous and resident fish (off-channel refugia and winter rearing), waterfowl and other birds, mammals</li> <li>- Native plant richness</li> <li>-Productivity and export</li> </ul>
Wetland Creation	31.3	34.8	66.1	<ul style="list-style-type: none"> <li>- Invasive species removal and management</li> <li>- Grading to contour the ground surface, establish wetland hydrology, and connect to adjacent habitat components</li> <li>- Installation of wetland plants</li> <li>- Placement of large woody debris and small brush piles to create habitat features</li> </ul>	<ul style="list-style-type: none"> <li>- Removal of sediment, nutrients and toxics</li> <li>- Flood water storage (reduce peak flows and erosion)</li> <li>- Groundwater recharge (wetlands connected directly to hyporheic zone of Skykomish River)</li> <li>- General habitat suitability (wetlands fit in this context of this floodplain zone along the Skykomish)</li> <li>- Habitat for: invertebrates, amphibians, anadromous and resident fish (off-channel refugia and winter rearing), waterfowl and other birds, mammals</li> <li>- Native plant richness</li> <li>-Productivity and export</li> </ul>
Upland Enhancement	14.2	15.9	30.1	<ul style="list-style-type: none"> <li>- Invasive species removal and management</li> <li>- Limited grading to establish transition zones connecting to adjacent aquatic resources</li> <li>- Installation of upland plants to establish a riparian forest</li> </ul>	<ul style="list-style-type: none"> <li>- Flood water storage</li> <li>- source of large woody debris and shade</li> <li>- Food supply (detritus) to adjacent aquatic resources</li> <li>- Terrestrial wildlife habitat (birds, mammals, amphibians)</li> </ul>

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Table 5. Proposed Phase 1 Habitat Improvement Activities and Anticipated Functions (Cont'd.)

Habitat Component	Phase 1A Area	Phase 1B Area	Total Phase 1 Area	Habitat Improvement Activities	Cumulative Anticipated Functions
Riparian/Channel Complex Creation	24.1	15.8	39.9	<ul style="list-style-type: none"> <li>- Excavation to establish appropriate channel morphology, connection to Skykomish River and aquatic resources</li> <li>Grading to establish transition zones connecting to adjacent aquatic resources</li> <li>- Placement of large woody debris, boulders, and other in-stream habitat features (riffle/pools)</li> <li>- Placement of appropriate initial channel substrate</li> <li>- Configuration of channel inlet and outlet structures</li> <li>- Installation of upland, wetland and transitional plants to establish a riparian forest</li> <li>-Stabilization of upper banks with temporary native vegetation</li> <li>- Invasive species removal and management</li> <li>Planting along banks</li> </ul>	<ul style="list-style-type: none"> <li>- Habitat for anadromous fish (off-channel refugia, spring summer rearing habitat; appropriate substrate, channel morphology, connectivity)</li> <li>- Water quality benefits (temp. reduction through shade, in stream sediment deposition)</li> <li>- Connectivity to Skykomish River and adjacent aquatic resources within the riparian zone</li> <li>- Additional flood conveyance at high flows</li> <li>- Flood water storage</li> <li>- Re-establishment of habitat forming processes (channel migration, floodplain dynamics, sediment depositions and erosion, etc.)</li> <li>- Source of large woody debris and shade</li> <li>- Food supply (detritus) to adjacent aquatic resources</li> <li>- Terrestrial, channel and wetland wildlife habitat</li> <li>- Improvements to water quality/nitrogen cycle associated with knotweed removal</li> </ul>
Riparian/Channel Complex Enhancement	11.0	0	11.0	<ul style="list-style-type: none"> <li>- Invasive species removal and management</li> <li>-- Installation of upland, wetland and transitional plants to enhance existing riparian forest</li> <li>- Minor grading to ensure proper flow and connections with Skykomish River and proposed adjacent channel network.</li> </ul>	<ul style="list-style-type: none"> <li>- Flood water storage</li> <li>- Source of large woody debris and shade</li> <li>- Food supply (detritus) to adjacent aquatic resources</li> <li>- Terrestrial, channel and wetland wildlife habitat</li> <li>- Improvements to water quality/nitrogen cycle associated with knotweed removal</li> </ul>
Slope Preservation Area	2.9	1.6	4.5	<ul style="list-style-type: none"> <li>- No actions anticipated within this zone</li> </ul>	<ul style="list-style-type: none"> <li>- Source of large woody debris and shade</li> <li>- Food supply (detritus) to adjacent aquatic resources</li> <li>- Terrestrial wildlife habitat</li> </ul>
<b>TOTAL</b>	<b>98.4</b>	<b>73.6</b>	<b>172.0</b>		

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### *8.1 Palustrine Floodplain Wetlands*

Within Phase 1, a total of 66.1 acres of palustrine floodplain wetland will be created and 20.4 acres of existing palustrine floodplain wetlands will be rehabilitated as shown in Figure 3. Functional assessment scores have been projected in Table 6 below and are compared to existing functional assessment scores using WAFAM. The Year 10 function assessment projections were based on projected values which factor the improvements planned for Phase 1 and achievement of performance standards detailed in Section 9 below. These estimates of the functions provided by the rehabilitation of existing wetlands and the creation of wetlands from currently upland pasture area are based on knowledge of site conditions and best professional judgment.

Table 6. Anticipated Functional Lift for Pre- and Post-Phase 1 Construction Conditions <sup>(1)</sup>

Function	Existing Wetland	Rehabilitated Wetland Area	Existing Upland Pasture <sup>(2)</sup>	Created Wetland Area
Removing Sediments	6	7	Low	7
Removing Nutrients	5	5	Low	3
Removing Toxics	7	7	Low	5
Reducing Peak Flows	7	7	Low	8
Decreasing Erosion	6	8	Low	7
Recharging Groundwater	4	5	Low	4
General Habitat	7	9	Low	9
Suitability for Invertebrates	7	8	Low	8
Amphibians	5	7	Low	7
Anadromous Fish	7	8	N/A	8
Resident Fish	6	6	N/A	7
Birds	6	6	Low	5
Mammals	7	8	Low	8
Plant Species Richness	3	7	Low	7
Organic Export	5	6	Low	5

(1) Index scores can range from 1 (low) to 10 (high)

(2) The WAFAM is not an appropriate method for assessing hydrologic or wildlife functions in upland areas. Functions were approximated based on knowledge of the site and best professional judgment on a High, Moderate, Low scale.

#### **A. Wetland Creation**

The Phase 1 area proposed for wetland creation is currently disturbed pasture. Functions are limited to a small amount of wildlife habitat, primarily for small mammals and the raptors that feed on them. Although floodwaters do enter this area when river levels are high, the lack of woody plants limits the floodwater attenuation and sediment removal functions. By converting these areas from disturbed pasture to forested, scrub-shrub, and emergent wetlands, the wildlife habitat, floodwater attenuation, and water quality functions will be substantially increased.

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Areas planted with dense cover of trees, shrubs, and/or sedges will create the potential for increased floodwater attenuation, sediment removal, nutrient removal, decreased erosion, and groundwater recharge during flood events. Other functions that currently are not provided by the pasture area, but would be provided by the created wetland include mammal, amphibian, and bird habitat, high native plant richness, resident salmonid habitat, escapement of fish during periods of receding peak flows, and productivity and export of organic matter. Created palustrine wetlands will provide significant habitat, water quality, flood attenuation and sedimentation benefits and provide floodplain connectivity between the river, mesic riparian forests, and upland areas.

As shown in Tables 5 and 6 above, wildlife and hydrologic functions are expected to be increased by creating wetland in the existing disturbed pasture. General habitat, all specific wildlife habitat, and native plant richness functions are expected to increase from low levels to high and moderate levels. Removal of sediment, decreased erosion, and reduced peak flows are also expected to increase to high and moderate levels. Removal of toxics, removal of nutrients and groundwater recharge functions are expected to increase to moderate and low-moderate levels.

### **B. Wetland Rehabilitation**

Most of the existing Phase 1 wetland area is covered by emergent vegetation that is dominated by reed canarygrass and other non-native species. Rehabilitation of this area will result in structurally complex native plant communities that will include scrub-shrub and forested wetland classes. Forested and scrub-shrub communities will provide nesting, feeding, breeding, and shelter habitat for many wildlife species that currently have limited or no habitat in the reed canarygrass wetland areas. The addition of specific habitat features such as root wads, logs, standing snags, and boulders will add further habitat complexity to the existing wetland. Habitat is expected to improve for migratory songbirds, small mammals, adult amphibians, resident fish, deer, and insects. The addition of dense woody plant communities into disturbed wetland is expected to improve floodwater storage and water quality functions as well. Dense woody vegetation will act to slow the movement of surface water during flood events, which can enable the settling of sediment and the attenuation of floodwaters.

The existing wetland also includes smaller areas of scrub-shrub communities, and emergent and aquatic bed areas dominated by native plants. The scrub-shrub areas function at a moderate level for wildlife habitat, primarily for songbirds. The wildlife habitat and water quality functions are limited by small size and scattered distribution of the scrub-shrub areas. Connecting the existing scrub-shrub areas by planting trees and shrubs throughout the disturbed areas of the wetland will improve wildlife habitat and water quality functions.

The existing native emergent and aquatic bed plant communities are located in the pond and in the main channel. The plant community in the pond is relatively healthy and would not be planted. Improvements in this area would include the addition of snags and bird boxes in the shallow areas of the pond and the establishment of a forested wetland around the perimeter of the pond. Tall trees and snags around the perimeter of the pond

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are expected to increase edge habitat, which would increase the available habitat for amphibians, songbirds, waterfowl, cavity nesting birds, raptors, and small mammals. The main channel area contains small pocket of native plants interrupted by non-native plants such as reed canarygrass and overhanging Himalayan blackberry. Removal of these non-native plants and the planting of native trees and shrubs would provide wildlife habitat similar to that described for the pond area.

Grading and contouring of the adjacent created wetland area will result in hydrological changes to the existing wetland areas. The result of these changes will be an increased flow through the existing pond and stream channel network. The increased flow will allow for the flux of organic material, energy, and animals through the system. Higher productivity and diversity are often seen in dynamic flow-through wetland systems, and increase in these functions is expected in the rehabilitated wetland.

As shown in Tables 5 and 6 above, the results of the function assessment suggest that wildlife and hydrologic functions will have modest increases following rehabilitation of the existing wetland. Many of the functions are currently at moderate to high levels and so modest increases in function are expected. Decreased erosion, general habitat, anadromous fish habitat, invertebrate habitat, and mammal habitat are all expected to increase from a moderate level to a high level. Native plant richness is expected to increase from the current low level to a high level. Increases in function are also expected for removing sediments, groundwater recharge, amphibian habitat, and organic export.

### ***8.2 Riparian/Channel Complex (Channel Migration Zone)***

A total of 39.9 acres of riparian/channel complex will be created, and 11.0 acres of existing riparian/channel complex will be enhanced within Phase 1. This area will contain a variety of habitat types that will serve to provide high ecological function for hydrology, water quality, and habitat. Viewed as a whole, and within a basin context, the approximately 50 acres of newly restored and enhanced riparian/channel complex will serve a critical role in watershed recovery and provide a variety of functional lift:

**Habitat:** Phase 1 of the Bank represents one of the largest efforts to date to restore a significant area of side channel and off channel habitat in the Snohomish River system, widely believed to be the next critical piece towards recovery of endangered Chinook and Coho salmon runs within the Snohomish River watershed. Salmon are the ecological linchpin of Puget Sound fluvial systems, providing the major source of nutrients to rivers that is the foundation for all other biological production.

**Hydrology:** By creating additional conveyance through the Phase 1 reach, construction activities will reduce the water surface elevation of flood flows near the site, thereby decreasing the pressure on levees and neighboring properties. Improvements to the riparian/channel complex in Phase 1 result in the protection of approximately 100 acres on the opposite riverbank during 2-year, 10-year, and 50-year flood events. In addition, extending the active channel across the floodplain will increase the lateral recharge zone, thereby having a pronounced affect on shallow groundwater recharge. This will have

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direct benefits to local habitat by prolonging the discharge of cool groundwater to isolated pools, and may potentially benefit regional groundwater aquifers.

**Water Quality:** Phase 1 will have immediate and long term benefits to water quality. The additional drainage of surface waters through the riverine wetlands will improve water quality by filtering surface drainage that may now directly enter the river system. The increased channel capacity and increased floodplain area will enable greater deposition of fine sediments through the project reach, thereby reducing suspended particulates.

Each component of the riparian/channel complex is described in greater detail below.

### **A. Riparian/Channel Complex Creation Areas**

Within Phase 1, a Riparian/Channel Complex will be created in areas that are currently disturbed pasture with very few woody plants. The Riparian/Channel Complex will include a mosaic of aquatic resource areas including stream channels, wetlands, near-channel riparian areas, and mesic riparian forest. Creating a mosaic of aquatic/riparian habitats will substantially increase available wildlife habitat, floodwater control, and water quality functions. Geomorphic processes are incorporated into the design to restore a dynamic, changing floodplain landscape where geomorphic processes will create and sustain naturally functioning habitat along the margins of the Skykomish River. The proposed channel complex will mimic the function and morphology of historic and present-day natural analogs located in the vicinity of the project site.

#### **1. Near-channel Riparian Areas:**

The created channels are expected to change over time and developed areas similar in structure to the existing near-channel and in-channel environments. Planted riparian vegetation is expected to colonize gravel bars and banks. Many of these areas will not be jurisdictional wetlands but will provide important functions to the aquatic environment, such as such as increased shade to reduce thermal input, flood conveyance, insect and organic material input, bank cohesion and sources of LWD.

Water quality benefits will result from increased storage, filtration and sedimentation. Additional flood conveyance and residence time of flood waters in the near-channel riparian areas will also reduce the risks of flooding to upstream and downstream properties.

#### **2. Riverine Wetlands**

Riverine wetlands will develop naturally in small pockets and bands adjacent to the restored side channels. Vegetation in these wetlands is expected to be a mix of shrubs, sedges, and grasses. A precise estimate of the area of riverine wetlands that will be created is not practical, due to the dynamic processes within the channel. These riverine wetlands are integral to the functions of the riparian habitat, and they are included in the overall area measurements of the riparian/channel complex. The riverine wetlands will provide a seasonal hydrologic connection between the Skykomish River and adjacent riparian forests and the palustrine floodplain wetlands when river stage rises above the

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elevation of the connection. Ground water will enter the wetlands through hyporheic flow driven by river stage. In this configuration, the wetlands will serve a critical role in flood attenuation and improved water quality, as well as providing rearing habitat for juvenile salmonids during high river stage, and habitat for amphibians, birds and mammals year-round. Water quality benefits will result from increased storage, filtration and sedimentation. Additional flood conveyance and residence time of flood waters in the riverine wetlands will also reduce the risks of flooding to upstream and downstream properties.

### **3. Stream Channels**

The most effective stream channel habitat is created through the dynamic processes of channel shifting, pool formation, scour pools, undercut banks, and LWD recruitment. Therefore, constructed channels will experience expansion, sediment deposition, and shifting over time. The creation and restoration of side channel habitat has significant potential to increase salmonid populations, protecting juvenile salmonids from peak flows and providing stable overwintering habitat accessible through a connection with the Skykomish mainstem. Stream channels will establish a surface water connection with the Skykomish River at varying ranges of flows to provide adequate flow to restore channel function, flush channels of sediment plugs and reconnect isolated habitat. During periods of low flow, groundwater will infiltrate the channel substrate to provide isolated, shaded, low-temperature pools for summertime rearing. During periods of peak flow, overflow channels, constructed at higher elevations than the main channels, will provide for relief of stream power and promote channel shifting and braiding.

Wood presence in off-channel areas serves a function different than wood in the mainstem Skykomish River. One of the primary habitat benefits of wood in large rivers is the ability of log jams, through anastomosis, to force the formation of side channels and off channel areas that serve as valuable rearing habitat. Wood can play a large role in the physical and morphological formation of large river systems.

In this case, wood has a greater role in local, rather than basin-scale processes. In the off channel zone, wood provides a greater biological role than morphological. Wood will function in the channel zone by:

- Creating pool habitat by concentrating flows and creating scour pockets around structures;
- Providing cover and food for salmon and other aquatic, terrestrial, and avian species;
- Providing pathways for wildlife to cross, enter, or more easily access the channel for selected uses; and,
- Retaining organics (wood, detritus, and carcasses) that provides nutrients to aquatic organisms.

### **4. Mesic Riparian Forest**

These zones serve a vital role in the overall value and function of the ecosystem that will be restored through the implementation of Phase 1. Mesic riparian forest in the

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riparian/channel zone areas will be achieved by creating conditions suitable for plants adapted to withstand occasional flooding and to growing in close proximity to wetlands and streams. Trees and shrubs appropriate for the mesic growing conditions in the vicinity of wetlands and streams will be planted. The improvements will increase structural diversity and plant richness in the vegetation community, which will result in a significant increase in the available breeding, nesting, feeding, and shelter habitats for many species of wildlife that currently have limited or no habitat in the disturbed pasture.

The mesic riparian forest area will also receive temporary flooding during high river levels (i.e., 2-year events and greater). For this reason, this forest will have different functions than a more typical, dry, upland forest consisting of plants such as salal and Douglas fir. A mixed coniferous-deciduous forest with a dense understory of shrubs will act to slow the movement of floodwater, which similar to the adjacent created wetland, will act to increase floodwater attenuation and improve water quality functions by increasing sediment removal.

### **B. Riparian/Channel Enhancement Area**

Existing areas of Riparian/Channel Complex within Phase 1 will be enhanced through invasive weed removal, underplanting with native trees, and restricting access of motor vehicles. This area has relatively high wildlife habitat, fish habitat, floodwater attenuation, and water quality functions. However, the large amount of invasive weed cover, particularly exotic knotweed, lowers the wildlife habitat, erosion/shoreline protection, and water quality functions. Removal and control of these invasive weeds will result in increases in each of these functions as well as reintroduce nutrients back into the vegetative growth cycle. Planting native conifers in portions of the mesic riparian forest areas will provide additional wildlife habitat, provide shade to help control the spread of invasive weeds, and provide another source of LWD. Preventing off road vehicle access to the Riparian/Channel Complex will also improve wildlife habitat functions and decrease the potential for pollutant inputs to the system.

### **8.3 Upland Enhancement**

Most of the existing upland areas within Phase 1 will be converted to wetland and riparian/channel complex. The remaining Phase 1 upland areas will be enhanced as forested uplands. In addition to the value by association, certain areas of upland forest will also include a mosaic of smaller “pocket” wetlands throughout this habitat zone (See also Figure 3B). The final grading will create an undulating landscape with low areas with compacted silt soil that will support perched wetland hydrology. These small wetland areas are expected to be seasonally flooded by spring rains and will be planted with thin-stemmed emergent vegetation. This will provide breeding habitat for native amphibians away from permanently flooded areas where predation by non-native bullfrogs and fish are often a problem.

Overall, upland enhancement will include planting a diverse mix of native trees and shrubs, with the goal of developing a forested upland plant community. A forested upland plant community will add structural complexity to the vegetation which currently has little or no woody plants. This added structural complexity will provide large

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amounts of nesting, feeding, and breeding habitat for a wide variety of birds, mammals, amphibians and insects. Upland areas will serve an important role in providing a terrestrial habitat zone adjacent to the riparian/channel complex and wetland zones. The enhanced upland forest area will be home to birds and mammal species that rely on open water, riparian, and wetland areas for foraging and prey species. Close proximity of upland habitat to these aquatic resource areas is necessary for many of these species to survive, especially during flood events. Many amphibian species spend much of their adult lives in upland forest and rely on close proximity to wetland and riparian areas for breeding.

### **9 Objectives and Performance Standards**

Skykomish Habitat expects the development of Phase 1 to result in substantial gains in aquatic and ecosystem function over those that are now present or would likely remain on the site if Phase 1 was not constructed. Because these functional gains will be used to offset comparable losses to the aquatic environment at other sites within the service area, Skykomish Habitat must be able to document that it has successfully delivered those aquatic ecosystem gains before certain credits can be awarded for sale, use, or other transfer. Skykomish Habitat's success will be measured by the following objectives established for Phase 1, each of which is divided into specific performance standards.

The performance standards under each objective provide a gauge for measuring the ecological success of restoration, rehabilitation and enhancement efforts within Phase 1. Each phase will be independently evaluated to assess the attainment of these objectives and performance standards. The As-Built Report for Phase 1A will be submitted following the completion of construction of the Phase 1A area (Phase 1A Year 0). However, the Monitoring and Reporting for Phase 1A will be suspended until it can be synchronized with the monitoring and reporting for Phase 1B. For purposes of the Phase 1 monitoring and reporting program "Year 1" is defined as the calendar year immediately following the year in which Phase 1B is constructed.

Unless otherwise noted, all documentation required for showing attainment of performance standards will be submitted to the MBRT for review and approval as a condition of credit release. Documentation can typically be included in required monitoring reports.

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Objective 1. Permanently protect aquatic ecosystem functions at the Bank by completing the Instrument, granting a conservation easement with permanent funding for site stewardship, and securing financial assurances. Each of the performance standards associated with this objective (1A – 1D) must be met before any Bank credits may be awarded.

Performance Standard
1A. Complete the development of an appropriate Instrument and provide each MBRT member an original signed Instrument.
1B. Provide the MBRT a copy of the signed MBRT-approved conservation easement protecting the bank site along with evidence that the easement has been duly recorded with Snohomish County and placed on the property title.
1C. Protect the Phase 1 buffer area (shown in Figure 3) with an MBRT-approved conservation easement. Provide the MBRT a copy of the signed conservation easement with evidence that it has been duly recorded with Snohomish County and placed on the property title.
1D. Secure MBRT-approved financial assurances for Phase 1 pursuant to the requirements of Article III.C.1. of the Basic Agreement. Provide the MBRT a copy of the completed financial assurance for construction; the MBRT expects Sponsor to provide a copy of each additional financial assurance in a timely manner as each is secured.

Objective 2. Create and rehabilitate 46.2 acres of wetlands in Phase 1A and 40.3 acres of wetlands in Phase 1B.

Performance Standard
2A. Perform earthwork to lower subgrade elevation and replace and stabilize topsoil to support plantings; develop and submit as-built survey that demonstrates the site has been graded according to plan, noting any deviations from the approved plan, including photographs, and a summary activity report.
2B. In years 3 and 7 use data collected from permanent monitoring wells as well as visual confirmation of soil saturation to demonstrate that wetland hydrology is present in areas that were either restored or enhanced. The standard for awarding the full credit releases for wetland areas in years 3 and 7 will be based on demonstrating that at least 85% of the target wetland acreage demonstrates wetland hydrology. To meet this performance standard, Phase 1A must exhibit wetland hydrology over at least 36.3 acres, and Phase 1B must exhibit wetland hydrology on at least 34.3 acres.
2C. In years 5 and 10 a wetland delineation using the 1987 Corps of Engineers Wetland Delineation Manual and Washington State Wetland Delineation Manual will be performed to verify the wetland acreage attained in the Phase 1 “wetland creation” and “wetland rehabilitation” areas. At least 50% of the proposed wetland creation acreage must be met to obtain credits for the upland areas. The standard for awarding credit in Years 5 and 10 will be based on demonstrating that at least 85% of the target wetland acreage meets the wetland criteria of the 1987 Corps of Engineers Wetland Delineation Manual.

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Objective 3. Restore and enhance riverine wetland function through construction of side channel complex, and promote channel braiding and shifting within channel migration zone. Side channel configuration should promote maximum utilization by rearing salmonids, particularly Endangered Species Act (ESA) listed Chinook salmon

Performance Standard
3A. Complete construction of side channel complex and inlet structures according to the approved design. The approved design includes 8 large woody debris (LWD) structures for Channel A and 8 LWD structures for Channel B. Each structure will be constructed of at least three LWD pieces. Develop and submit an as-built survey, demonstrating the LWD structures have been installed according to plan, noting any deviations from the approved plan, and including photographs and a summary activity report.
3B. Side Channels A and B will flow and have upstream and downstream connections to the Skykomish River when the river's flow in the project reach is greater than 3500 cfs during years 1, 3, 5, 7 and 10.
3C. Demonstrate retention of key LWD/engineered log jams through retention of at least 5 LWD structures for Channel A and 5 LWD structures for Channel B in years 1, 3, 5, 7, and 10.
3D. Construct and maintain at least 6 riffle/pool complexes within Channel A and 5 riffle/pool complexes within Channel B. The water depth in each pool must be at least 1 meter during summer months in years 1, 3, 5, 7, and 10.

Objective 4. Restore a diverse community of native wetland, riparian and stream vegetation as appropriate for the site

Performance Standard
4A. Site planted according to approved planting plan. Develop and submit as-built planting survey that demonstrates the site has been planted according to plan, noting any deviations from the approved plan, and including photographs and a summary activity report.
4B. PFO Wetlands – At years 3, 5, and 7 forested wetlands will have a minimum density of 350 living native trees, at least one meter in height, per acre. Four native tree species shall each have a minimum density of 35 trees per acre.
4C. PSS Wetlands – At years 3, 5, and 7 scrub-shrub and upland areas will have a minimum density of 350 living shrubs per acre. Five native woody species shall each comprise at least 10% of the number of trees and shrubs in these areas.
4D. PEM Wetlands/PAB – At years 3, 5, and 7 emergent wetland and aquatic bed areas will have a total of at least 10 native facultative or wetter species.
4E. PEM Wetlands/PAB – At years 3, 5, and 7 marsh and wet meadow areas will exhibit at least 70% areal cover of native facultative and wetter species. No single species shall make up more than 30% of the total areal cover.
4F. Riparian Zone – At years 3, 5, and 7 forested and scrub-shrub species in the Riparian Upland Forest will have a minimum density of 350 living native trees or shrubs per acre for plants at least one meter tall. Five native species shall each comprise at least 10% of the trees or shrubs in this area.
4G. Uplands – At years 3, 5, and 7 forested wetlands will have a minimum density of 350 living native trees, at least one meter in height, per acre. Four native tree species shall have at least 35 individuals per acre
4H. At year 10 forested wetlands will exhibit a minimum average density of 250 living native trees per acre for trees at least three meters in height and scrub-shrub wetlands will exhibit a minimum average density of 250 living native shrubs per acre.

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4I. At year 10 there will be at least 8 native facultative and wetter species in emergent wetland and aquatic bed areas.

4J. At year 10 emergent wetlands will have at least 90% areal cover of native facultative and wetter species. No single species shall comprise more than 30% of the total areal cover.

Objective 5. Control invasive species to allow native vegetation communities to establish and dominate the bank site.

### Performance Standard

5A. In year 3, the cover of invasive species in each area of Phase 1 of the Bank will be no more than 50% of the pre-construction baseline cover, and the Year 5 cover of invasive species will be no more than 25% of the pre-construction baseline. For the purpose of performance standard 5A invasive species are Himalayan blackberry, reed canarygrass, and Scot's broom.

Baseline mapping of invasive species cover will be conducted prior to construction. The size and location of each patch/colony of invasive species larger than 30 square feet will be mapped. The areal extent of invasive species will be remapped during June – August of Years 3 and 5 and reported to the signatories. The reports will document changes in the cover of invasive species relative to baseline conditions and describe the status and results of invasive species management activities.

5B. Knotweed and ivy – in Year 1 the amount of individual cover will be reduced to less than 50% of the baseline population, in Year 3 the number will be reduced to no more than 25% of baseline, and in Years 5 and 7 the number will be reduced to no more than 10% of baseline. After year 7, all occurrences of knotweed and ivy will be treated to achieve total removal by Year 10.

Sponsor will submit monitoring reports documenting progress in eradicating knotweed and ivy on the bank site by listing and/or mapping each patch located and treated during annual inspections. Monitoring reports will include representative photos taken between May 1 and July 31 from permanent photo points.

5C. In Year 10 invasive species, as a group, do not cover more than 20% of the Phase 1 site. Submit a report on the results of a statistically valid survey of the vegetative cover of the bank site. At each survey site (e.g., transect), the areal cover of each invasive species present shall be combined into a single “invasive species” group.

Objective 6. Create and enhance wildlife habitat within the entire Phase 1 area.

### Performance Standard

6. At least one (1) wildlife brush pile, one (1) perch pole, and one (1) woody debris pile will be constructed per five (5) acres across the entire site. Develop and submit an as-built survey demonstrating these structures were constructed and installed according to plan, noting any deviations from the approved plan, and including photographs and a summary activity report. The condition and wildlife use of these structures should be included in annual monitoring reports.

## 10 Credit/Debit Determination

Phase 1 credits will be established and awarded to the Bank upon Skykomish Habitat's demonstration that the performance standards listed above have been met.

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### ***10.1 Credit Equivalency Definition:***

For this Bank, a credit is defined as the increase in aquatic ecosystem functioning equivalent to the aquatic ecosystem function provided by one acre of intact Category II wetland in Western Washington. Detailed lists of functional attributes are contained within Table 5.

A credit from the Bank represents an area where the river flows freely from the mainstem Skykomish River, through a dynamic side channel network, and into floodplain wetlands, while carving out complex niches of side channels and pool habitat that will provide critical off-channel refugia for juvenile and rearing salmonids. Under this definition, the use of a credit reflects the full value of the ecological benefits provided by the integrated components of the dynamic, natural process-driven system by recognizing the results from restoring dynamic habitat-forming processes that form complex, multi-component habitat.

### ***10.2 Phase 1 Credit Valuations:***

The opportunity for process-driven restoration is unique based on the landscape position of this site such that it is able to accommodate the restoration of natural river processes without adversely affecting neighboring properties. Within the State of Washington, this sort of process-based restoration is highlighted in numerous technical reports and recommendations from federal, state, WRIA and other technical advisory panels as the type of restoration that needs to occur in order to restore aquatic resources on an ecosystem or landscape scale, and to promote the recovery of threatened and endangered species. Nationally, process-based restoration is gaining wide acceptance as the preferred mitigation method as resource agencies and trustees realize the benefits of combining best available science with sound ecosystem and landscape-level planning. The shift toward this kind of restoration is one of the cornerstones of the USEPA National Mitigation Action Plan (Dec. 2004), and has been encouraged by many recent programmatic interpretations and guidance documents. Specific references to a preference toward process-based restoration include: National Academy of Sciences Study "Compensating for Wetlands Losses"; Board on Environmental Studies & Toxicology, Water Science & Technology Board, National Research Council 2001; Federal Regulatory Guidance Letter 02-2; The Snohomish River Basin Salmonid Habitat Conditions Review (SBSRTC 2002), The Snohomish River Basin Chinook Salmon Near Term Action Agenda (SBSRF 2001).

The Bank includes six proposed habitat components that will each have a separate credit value ratio that, when combined, will yield a single usable credit to offset a potential suite of functions that may require mitigation.

In the context of the Bank, the value of wetland creation and rehabilitation follows established precedents and is therefore straightforward. The established value for wetland creation will be one (1) mitigation credit for every one (1) acre of wetland creation. The value of wetland rehabilitation derives from the comparison between existing wetland condition and the ecological lift that will result from rehabilitation. The existing wetlands are dominated by invasive species and lack connectivity to other

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wetland areas and the rest of the floodplain complex. Rehabilitation of these wetlands requires aggressively removing existing invasive plants, establishing diverse native plant communities appropriate for post-construction hydrology, and establishing connectivity to adjacent habitats. The established value for rehabilitation of two (2) acres of wetlands will be one (1) mitigation credit.

The habitat restoration plan includes approximately 30 acres of Upland Enhancement. The upland areas included within the mitigation bank boundaries serve an essential ecological purpose by providing nearby upland area in association with the adjacent aquatic resource habitats. During flood events, the nearby availability of accessible upland areas is critical for terrestrial wildlife. In addition to the value by association, the Upland Forest will include pocket wetlands throughout this habitat zone. The final grading will create an undulating landscape with low areas that will support wetland hydrology. The inclusion of wetland areas with the Upland Enhancement habitat element justifies assigning a higher credit ratio. The established value for enhancement of five (5) acres of uplands will be one (1) mitigation credit.

The Riparian/Channel Complex includes a mixture of stream channels, wetlands, and riparian forest. The design is intended to restore a dynamic, changing floodplain landscape where geomorphic processes will create and sustain naturally functioning habitat along the margins of the Skykomish River. The proposed channel complex is designed to mimic the function and morphology of historic and present-day natural analogs located in the vicinity of the project site.

In the context of the Bank, the established value of every one and a half (1.5) acres of riparian/channel complex creation will be one (1) mitigation credit. And for every three (3) acres of riparian/channel complex enhancement, the established value will be one (1) mitigation credit.

Credits for the Bank will be calculated as shown in the table below:

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Table 7. Credit Generation by Improvement Activity

<b>Phase 1A</b>	<b>Area (acres)</b>	<b>Credit Ratio</b>	<b>Anticipated Number of Credits *</b>
Activity			
Wetland Rehabilitation	14.9	2 : 1	7.5
Wetland Creation	31.3	1 : 1	31.3
Upland Enhancement	14.2	5 : 1	2.8
Stream Channel/Riparian Zone Complex Creation	24.1	1.5 : 1	16.1
Riparian/Channel Complex Enhancement	11	3 : 1	3.7
Slope Preservation Area	2.9	10 : 1	0.3
<b>TOTAL</b>	<b>98.4</b>		<b>61.6</b>

<b>Phase 1B</b>	<b>Area (acres)</b>	<b>Credit Ratio</b>	<b>Anticipated Number of Credits *</b>
Activity			
Wetland Rehabilitation	5.5	2 : 1	2.8
Wetland Creation	34.8	1 : 1	34.8
Upland Enhancement	15.9	5 : 1	3.2
Stream Channel/Riparian Zone Complex	15.8	1.5 : 1	10.5
Riparian/Channel Complex Enhancement	0	3 : 1	0.0
Slope Preservation Area	1.6	10 : 1	0.2
<b>TOTAL</b>	<b>73.6</b>		<b>51.4</b>

\* Anticipated Number of Credits: the final number of credits will be based upon actual acreage attained based on habitat type achieved in year 10.

Credits may be used as mitigation for upland buffer impacts provided the use of those credits is reported to the MBRT pursuant to the applicable provisions in Section 14 of this Instrument.

The Stream Channel/Riparian Zone Complex provides rearing habitat for Federally-listed and other priority fish species within the Bank area. These improvements provide substantial gains in fishery habitat quality that could compensate for adverse impacts of permitted projects that affect essential fish habitat. Skykomish Habitat will coordinate with the MBRT, Tribes, WDFW, NOAA Fisheries, and USFWS to determine potential

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future credit value for these habitat improvements. Nothing in this Instrument shall prevent Skykomish Habitat from working with the MBRT or authorized regulatory agency to develop new credits or exchange existing Bank credits for other types of endangered species or habitat credit defined in future years by regulatory agencies, provided this action does not conflict with the provisions of this Instrument.

### 10.3 Replacement Ratios

Table 8 provides guidance on the number of Skykomish Habitat Mitigation Bank Phase 1 credits typically required to offset authorized impacts to the aquatic environment. The impacts are assumed to result in the complete and permanent loss of the affected resource; temporary or partial losses may allow lower ratios. Regulatory agencies reserve the right to adjust these ratios on a case-by-case basis to ensure that impacts are adequately compensated for by the use of bank credits. For example, a ratio may be reduced or increased to account for project-specific requirements (or in the case of negotiated settlements, enforcement actions, or other cases) in order to ensure lost resources are adequately replaced.

Table 8. Replacement Ratios for Use of Mitigation Credits Required to Compensate for a Permanent Loss of a Listed Resource

Impacted Resource Type	Quality	Designation	Typical Mitigation Ratio for Use of Skykomish Bank Credits (credits: impact acres)
Wetland*			
	Low	Category 4	0.85 : 1
	Low	Category 3	1 : 1
	Medium	Category 2 wetland	1.2 : 1
	High	Category 1 wetland	case by case
Streams			
	Low	Stream Types 4 and 5 and Resident Salmonid Habitat	0.8 : 1
	Medium	Stream Type 3	1.1 : 1
	High	Stream Type 1 and 2	case by case
Riparian Buffer			0.2 : 1
Upland Buffer			0.2 : 1
Open Water		lakes, ponds, impoundments	case by case

\* Wetland category types are from "Washington State Wetlands Rating System, Western Washington" (Hruby, T. 2004. Washington State wetland rating system for western Washington – Revised. Washington State Department of Ecology Publication # 04-06-025). Stream types are from WAC 222-16-030 and 222-16-031

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### ***10.4 Eligible Users***

Public and private proponents of activities regulated under Sections 401 and 404 of the Clean Water Act (33 U.S. Code §§ 1341, 1344), Section 10 of the Rivers and Harbors Act of 1899 (33 U.S. Code § 403), Washington State Water Pollution Control Act (Chapter 90.48, RCW), Shoreline Management Act (RCW 90.58), Growth Management Act (RCW 36.70A), Hydraulic Code (RCW 75.20), and other Federal, State, and local authorities may be eligible to use the Bank as mitigation for unavoidable impacts. The Bank will be eligible to serve public and private end users by providing potential advance compensatory mitigation for authorized impacts to regulated areas that require mitigation to settle enforcement claims, off-site Natural Resource Damage Assessment offsets, ESA Section 9 violations (relating to threatened and endangered (T&E) species issues affecting Puget Sound salmonids), and similar uses. The Bank will provide replacement of lost functions and values including:

- Wetlands
- Stream Channel and Endangered Fisheries Habitat
- Riparian Habitat
- Upland/Buffer Habitat

Other types of credit users may include, but not necessarily be limited to, transfers made that are not associated with any one particular project or impact (i.e. “good will” transfers), transfers to natural resource stewards resulting from expenditures from in-lieu-fee, or similar type funds; and other conservation purposes.

## **11 Credit Release Schedule**

Requests for credit release must be submitted to the MBRT in writing along with documentation indicating that performance standards associated with the requested release have been met. As performance standards are met and documented, Skykomish Habitat may request the associated credit release in accordance with Tables 9.1 and 9.2 below. Credit release requests will typically be accompanied by the submission of an annual monitoring report that provides specific and statistically valid evidence which demonstrates that the site has met the appropriate performance standard milestone to justify the release of credits. The MBRT will review the documentation and release request and render its decision to release credits in a timely manner and will notify Skykomish Habitat in writing with its decision.

If Skykomish Habitat is not able to meet a particular performance standard by the year indicated in Tables 9.1 and 9.2 below, it will not impact the ability of Skykomish Habitat to receive credit releases without penalty for other performance standards which are not adversely impacted and which have been met and documented in a written request to the MBRT. Likewise, if Skykomish Habitat is not able to meet a particular performance standard by the year indicated in Tables 9.1 and 9.2 below, it may submit documentation of successful satisfaction of those performance standards during a subsequent year, and the MBRT will give full consideration to the award of appropriate credits without reduction or penalty.

No credits may be released associated with the Year 10 release unless at least sixty percent (60%) of the credits associated with Years 0 through 7 for that phase have been

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released. The MBRT may, at its discretion, also award partial credit for partial achievement of a performance standard. Once a credit is released, Skykomish Habitat may sell, use, or transfer that credit at any time, subject to the provisions of this Instrument.

**Table 9.1 – Credit Release Schedule for Phase 1A**

Performance Standard	Number of Credits Released (Bank Year)*						
	Signing	0	1	3	5	7	10
1A	2.31						
1B	2.31						
1C	2.31						
1D	2.31						
2A		3.70					
2B				3.33		3.23	
2C					3.60		2.03
3A		0.92					
3B		0.46	2.31	0.74	0.65	0.92	0.55
3C		0.46	2.31	0.74	0.65	0.92	0.62
3D		0.46	2.31	0.74	0.65	0.92	0.55
4A		1.39					
4B				0.46	0.46	0.46	
4C				0.46	0.46	0.46	
4D				0.46	0.46	0.46	
4E				0.46	0.46	0.46	
4F				0.46	0.46	0.46	
4G				0.46	0.46	0.46	
4H							0.62
4I							0.62
4J							0.62
5A				0.46	0.46		
5B		0.92	2.31	0.46	0.46	0.46	0.31
5C							0.31
6		0.92					
<b>Total</b>	<b>9.24</b>	<b>9.24</b>	<b>9.24</b>	<b>9.24</b>	<b>9.24</b>	<b>9.24</b>	<b>6.16</b>
Potential Annual Release%	15%	15%	15%	15%	15%	15%	10%
Cumulative Release Potential	15%	30%	45%	60%	75%	90%	100%

\* Year 0 is the calendar year during which construction is completed and as-built drawings are submitted to the MBRT in accordance with Section 16.A. In order to synchronize monitoring schedules for Phases 1A and 1B, Year 1 for Phase 1A will not commence until Year 1 for Phase 1B commences.

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Table 9.2 – Credit Release Schedule for Phase 1B

Performance Standard	Number of Credits Released (Bank Year)*						
	Signing	0	1	3	5	7	10
1A	1.93						
1B	1.93						
1C	1.93						
1D	1.93						
2A		3.08					
2B				2.78		2.70	
2C					3.01		1.70
3A		0.77					
3B		0.39	1.93	0.62	0.54	0.77	0.46
3C		0.39	1.93	0.62	0.54	0.77	0.46
3D		0.39	1.93	0.62	0.54	0.77	0.46
4A		1.16					
4B				0.39	0.39	0.39	
4C				0.39	0.39	0.39	
4D				0.39	0.39	0.39	
4E				0.39	0.39	0.39	
4F				0.39	0.39	0.39	
4G				0.39	0.39	0.39	
4H							0.51
4I							0.51
4J							0.51
5A				0.39	0.39		
5B		0.77	1.93	0.39	0.39	0.39	0.26
5C							0.26
6		0.77					
Total	7.71	7.71	7.71	7.71	7.71	7.71	5.14
Potential Annual Release%	15%	15%	15%	15%	15%	15%	10%
Cumulative Release Potential	15%	30%	45%	60%	75%	90%	100%

\* Year 0 is the calendar year during which construction is completed and as-built drawings are submitted to the MBRT in accordance with Section 16.A. In order to synchronize monitoring schedules for Phases 1A and 1B, Year 1 for Phase 1A will not commence until Year 1 for Phase 1B commences.

Credits may not be awarded sooner than specified in Tables 9.1 and 9.2 except in extraordinary situations with the written approval of the MBRT.

## **12 Typical Procedures for Using the Mitigation Bank**

A permit applicant whose project would have an adverse impact on the aquatic environment within the service area of the Bank must generally obtain the approval of each regulatory agency with jurisdiction over that project in order to use the Bank as a source of compensatory mitigation. To receive approval to use the Bank, the applicant must demonstrate to the satisfaction of the regulatory agencies with jurisdiction over that project that the project complies with all applicable requirements pertaining to alternatives and mitigation sequencing and that purchasing credits from the Bank for compensatory mitigation would be in the best interest of the environment. Specifically, a permit applicant must generally be able to demonstrate to the satisfaction of the involved regulatory agencies that:

- A. There is no practicable alternative to adversely impacting the water body, critical area, buffer, or other regulated area,
- B. All appropriate and practicable measures to avoid and minimize adverse impacts to the aquatic ecosystem have been considered and included in the project, and
- C. All appropriate and practical on-site compensatory mitigation for unavoidable adverse impacts have been addressed.
- D. The use of mitigation credits for compensatory mitigation credits constitutes “environmentally preferable” compensation.

Local jurisdictions may establish policies where the best management practices for small impacts to low value, isolated wetlands are for the permittee to go directly to the Bank for credit. Upon receiving permission to utilize credits from the Bank the permittee must contact Skykomish Habitat to ensure that credits are available. Upon completion of the transaction, Skykomish Habitat will inform the permitting agencies of each completed transaction, via email with an attached copy of the accounting ledger.

## **13 Service Area**

The primary service area for the Bank includes WRIA 7 below the 2,500-foot elevation contour (see Figure 14) and includes the non-tidally influenced portions of tributaries to the Snohomish River that enter the river downstream of the State Highway Route 2 bridge near the City of Everett. The Bank may be used to compensate for permitted impacts in adjoining WRIAs or other nearby areas in King and Snohomish Counties if specifically approved by the appropriate agencies requiring mitigation and the MBRT, provided that such mitigation would be practicable and environmentally preferable to other mitigation alternatives. Out-of-WRIA impacts will only be allowed in special circumstances which will be evaluated on a case-by-case basis (e.g., projects that span multiple basins such as transportation and utility corridors and pipelines, and settlement of enforcement actions).

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It is solely the determination of the permitting agency as to whether use of the bank is environmentally preferable and appropriate to other mitigation alternatives. For *de minimis* impacts, use of the bank may be the environmentally preferable alternative even though the impact does not have a hydrologic link to the main stem of the Snohomish River. Areas without a direct hydrologic connection to the main stem of the Snohomish River include those areas which drain into the Sound and those areas which drain directly to the lower end of the estuary. For more significant impacts that are not hydrologically linked to the main stem of the river, use of the bank should be considered as one alternative for mitigation but not presumed to be the most ecologically appropriate or preferable mitigation option.

### 14 Accounting Procedures

- A. Skykomish Habitat will establish and maintain for inspection and reporting purposes a ledger of all credit transactions. Skykomish Habitat will record each credit withdrawal transaction with the Snohomish County Auditor, and submit a copy of the recorded transaction to the MBRT within 30 days. Skykomish Habitat will maintain a ledger of the credits that are awarded through the achievement of specified performance standards, as well as credits that are debited through sale, use, or transfer.
  
- B. The ledger shall contain information on the parcel number and address of the Bank, the Ecology docket number and Corps reference number for the Bank permits, and original recorded number of the conservation easement. The following information will be recorded in the ledger for each transaction:
  - 1. Date of transaction
  - 2. Number of credits transacted
  - 3. For credits awarded for sale, use, or transfer, reference the performance standards to which the awarded credits correspond
  - 4. For credit sales/use/transfers, include the name, address, and telephone number of purchaser/user/transferee; permit or project number(s) and name of the regulatory agency(s) requiring permits; location of the project for which the credits are being purchased; and a brief description of the adverse project impacts requiring compensatory mitigation (e.g., nature, size and quality of aquatic resource affected)
  - 5. For credits withdrawn from the ledger for reasons other than credit purchase, include the specific reason for withdrawal.
  - 6. Number of credits available in the Bank at the time of transaction
  - 7. Bank balance after the transaction
  
- C. Skykomish Habitat will provide the Co-chairs with a copy of each bank transaction detail along with confirmation that the sale has been properly recorded with Snohomish County within 30 days of the transaction.

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- D. Skykomish Habitat will provide the MBRT a copy of the bank ledger, as of December 31<sup>st</sup> of the previous year, by February 1 of each year, showing a cumulative tabulation of all transactions at the Bank to date. This ledger will be submitted in conjunction with the annual monitoring report until all credits have been awarded and sold, used, or otherwise transferred, or until the MBRT has accepted Skykomish Habitat's written certification that it has terminated banking activity.

## **15 Long-Term Protection and Management**

### ***15.1 Protective Covenant***

Skykomish Habitat will grant and record, pursuant to Article III.D., an appropriate conservation easement to protect the Phase 1 site area and required buffer area in perpetuity. This conservation easement must be approved by the MBRT. This easement will be recorded with Snohomish County. The conservation easement shall not be removed or modified without written approval of the MBRT. Conveyance of any interest in the property shall be subject to this conservation easement. Use prohibitions reflected in the easement will preclude the site from being used for activities that would be incompatible with the goals, objectives, and establishment and operation of the Bank. All restrictions shall be granted in perpetuity without encumbrances or other reservations, except those encumbrances or reservations (e.g. retention of recreational privileges by the landowners) approved by the MBRT and not adversely affecting the ecological viability of the Bank. Any area not encumbered by the conservation easement will not be credited for use in the Bank.

The conservation easement shall reflect, as one of the rights afforded the grantee, that the site owner warrants that it will comply with all such applicable state and local requirements for controlling noxious weeds on the Bank site. Furthermore, this conservation easement shall provide that all structures, facilities, and improvements within the Bank, including roads, trails and fences, that are merely incidental to the functionality of the mitigation site but are necessary to the Bank management and maintenance activities, shall be maintained by the site owner for as long as it is necessary to serve the needs of the long-term preservation of conservation values.

## **16 Monitoring, Reporting, Establishment Phase Maintenance and Remedial Action**

Skykomish Habitat will monitor and report on the progress of the Bank toward achieving the goals, objectives, and performance standards established by this Instrument and take all actions directed by the MBRT to remediate any problem that prevents a component of the Bank from achieving the goals, objectives and performance standards to the Bank. Procedures for as-built reports, monitoring reports and remedial actions are described below.

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- A. As-built reports will be submitted to the MBRT for each phase of construction (i.e., Phase 1A, and Phase 1B), upon the completion of grading and habitat structure installation activities to verify topography, hydrology, and habitat structures are installed according to the approved plans. This report will include site topography, wetland and aquatic area boundaries, LWD placement, designated photo points, groundwater monitoring wells, staff gauges, and other pertinent data. A separate as-built (as-planted) report will be provided to document the installation of planting as per the planting plan requirements. As-built reports will be submitted to each member of the MBRT within 30 days of completing construction of each phase of the Bank, and will describe in detail any material deviation from the applicable portion of the site plan, as described in Sections 7 and 8.
- B. The As-Built Reports for Phase 1A will be submitted following the completion of construction of the Phase 1A area. However, the Monitoring and Reporting for Phase 1A will be suspended until the Phase 1A schedule can be synchronized with the monitoring and reporting schedule for Phase 1B. For purposes of the Phase 1 monitoring and reporting program “Year 1” is defined as the calendar year immediately following the year in which Phase 1B is constructed and adequate as-built plans submitted to the MBRT. Monitoring reports shall then be submitted in Years 1, 2, 3, 4, 5, 7, 9 and 10.
- C. Skykomish Habitat will prepare and submit to the MBRT annual monitoring reports that document the construction of Phase 1 and its progress toward achieving the goals, objectives, and performance standards. Monitoring reports for each calendar year will be submitted by February 1 of the following year. These reports will inform the MBRT of the status of bank establishment and operation and provide the supporting information required to document the Bank meeting its performance standards in order to release credits as provided for in Section 11.
- D. Throughout the first winter and spring following each phase of construction of Phase 1, Skykomish Habitat will carefully monitor hydrology and the functioning of the constructed channel complex. Skykomish Habitat will also conduct an initial vegetation survey for each phase during the spring following planting to document success and to quickly respond to any problems. Results of these surveys will be included in the monitoring report.

### ***16.1 Reports***

Skykomish Habitat will submit to each member of the MBRT monitoring reports describing the conditions of Phase 1 of the Bank and relating those conditions to the project objectives and performance standards. Each monitoring report will contain the following information:

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- A. An overview of the current ecological condition of the Bank including a survey of the vegetative and wildlife communities, effectiveness of the restoration and enhancement activities accomplished to date, and progress of the Bank in achieving the specific performance standards of the Bank. To provide data for evaluating progress towards achievement of performance standards, permanent vegetation transects will be established at selected locations within each phase of the bank. The same performance transects will be revisited each period, with a record kept of all plant species found. Vegetation data in forested, scrub-shrub, emergent, and aquatic bed areas will include species, cover by species, average stem diameter, and height. Standard MBRT-approved vegetation measures and techniques will be used to demonstrate whether performance standards are being met. Experience in the field may indicate that other performance monitoring methods would provide more useful information; the MBRT must approve in advance any changes in the means of gathering or reporting performance data. All monitoring will be conducted by qualified personnel.
- B. A detailed discussion about the likely cause and impact of any setback or failure that occurred and recommendations for future actions and strategies that might resolve those problems.
- C. Pertinent additional information on such aspects of the Bank as hydrology, soils, vegetation, fish and wildlife use of the area, recreational and scientific use of the Bank, and acts of nature, such as disease, wildfire, and flooding, that occurred.
- D. Explanation of the need for any contingency or remedial measures, and detailed proposals for their implementation.
- E. Photographs of the Bank taken from permanent locations that are accurately identified on the as-built drawings. The photographs are intended to document the progress of each component of the Bank, as well as the Bank in general, toward achieving the goals and performance standards of the Bank. Such photo-monitoring will include general vantage points around the margin of the Bank, vantage points within the Bank, and at a specific monitoring locations such as transects (e.g. longitudinal transects along channel length) and/or sampling points.

### ***16.2 Remedial Action during the Establishment Phase of the Bank***

In the event that one or more components of Phase 1 of the Bank do not achieve performance standards or comply with any other requirement of this Instrument, the following sequence of remedial actions will be taken.

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- A. If the monitoring reports, or inspection by representatives of the MBRT agencies, indicate persistent failure to achieve and maintain the prescribed performance standards, Skykomish Habitat will propose adaptive management actions to correct the shortcomings. A thorough analysis of wetland monitoring data and stream channel assessments may result in the identification of other factors, not identified in the performance standards or monitoring data, causing the project to fall short of its objectives. The MBRT may also direct adaptive management actions, upon consultation with Skykomish Habitat, if the MBRT identifies a need for corrective action and no adaptive management plan acceptable to the MBRT has been submitted within a reasonable period of time. The adaptive management plan shall specify the nature of further examination of areas for potential causes of failure and/or corrective action to be conducted, the schedule of completion for those activities, and a monitoring plan for assessing the effectiveness of the corrective action. If needed, additional excavation at a future time during the operational life of the bank may be performed with written approval by the MBRT. The objective of the adaptive management plan shall be to attain the originally prescribed project objectives, either through achieving the original performance standard or through new standards subsequently developed based on evaluation of the site as it matures and as it is assessed. If modified or replacement performance standards are proposed, Skykomish Habitat may not initiate activities designed to achieve those replacement standards until those performance standards are approved by the MBRT. During the period that a specific component of the Bank is out of compliance, the MBRT may direct that credits generated by that Bank component may not be sold, used, or otherwise transferred.
- B. If remedial actions taken by Skykomish Habitat under the provisions of the preceding paragraph do not bring that component of the Bank into compliance with the requirements of this Instrument, including any approved changes to the Instrument, Skykomish Habitat may provide written notice of its intent to discontinue efforts to achieve one or more performance standards for that component of the Bank. Upon providing such notice, no additional credits may be established for that component, but at the discretion of the MBRT, Skykomish Habitat may be released from future maintenance and monitoring obligations for that component provided that releasing Skykomish Habitat from those obligations does not adversely affect the remainder of the Bank, or affect credits already sold, used, or transferred to date. If the MBRT approves such a release from Skykomish Habitat's obligations, any previously awarded credits not yet sold, used, or transferred for that component shall be removed from the Bank ledger.
- C. If the MBRT, in consultation with the Sponsor, determines that the failure of one or more components of the Bank to comply with the requirements of this Instrument adversely affects the ability of the Bank to achieve its goals or objectives, or if the Sponsor does not make a reasonable effort to bring the

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Bank into compliance with this Instrument, the MBRT, after consultation with the Sponsor, may terminate this Instrument and the operation of the Bank pursuant to Article IV.J.

- D. The MBRT may alternatively implement remedial action on its own initiative if Skykomish Habitat fails to address the persistent failure to meet performance standards by acting through a Third Party Designee by accessing the Letter of Credit funds account posted pursuant to Sections 17.1 and/or 17.2, Articles III.C.1., and III.C.2 of this Instrument.

### ***16.3 Maintenance during the Establishment Phase of the Bank***

General maintenance will be performed throughout the year to address conditions that may limit the success of the Bank area and attainment of performance standards and objectives. Skykomish Habitat is responsible for all site maintenance activities throughout the establishment phase of the Bank. Maintenance activities will include, but are not limited to, vegetative maintenance (including replanting, repair of any areas subject to erosion, weed control around plantings, mowing, control of invasive species, control and discouragement of herbivory on plants) and general maintenance (including fence repair, road and trail maintenance as necessary, monitoring of the channel inlets and outlets, and clean-up of trash).

## **17 Financial Assurances**

Skykomish Habitat will secure and maintain financial assurances in accordance with the subsections immediately below.

### ***17.1 Irrevocable Letter of Credit for Construction***

- A. The Irrevocable Letter of Credit prescribed in Articles III.C.1. of this Instrument, underlying the construction, establishment, and functionality of the Bank, will adhere to the following form and contents. Each Letter of Credit for Construction will be irrevocable. Each Letter of Credit may not be withdrawn or canceled by the issuing financial institution prior to the articulated expiration date, which may be no earlier than 18 months from the date of issuance. If the Letter of Credit for Construction applicable to any phase of the Bank shall expire by its own terms prior to the termination of the construction stage of the Bank as specified in Article IV.K. of this Instrument, Skykomish Habitat must reinitiate an acceptable Letter of Credit so that there is no interval in which there is no Letter of Credit in effect. No further credits will be awarded from any phase of the Bank while any phase lacks an effective Letter of Credit. Each Letter of Credit will provide that the issuing financial institution shall honor the credit engagement and pay to the Third Party Designee the directed sum without inquiring whether the directing Beneficiary agency or the receiving Third Party Designee has a right to make such a demand, and without acknowledgement of any inconsistent claim of Skykomish Habitat to those funds.

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- B. Each Letter of Credit for Construction will be issued to, and will designate, the Corps and Ecology as distinct and independent beneficiaries. Upon the direction of either the Corps or Ecology, in writing on agency letterhead, the issuing financial institution shall disburse from the credit funds account to the Third Party Designee the amount specified by the Corps or Ecology, up to a maximum cumulative amount as reflected in the Letter of Credit. The Corps or Ecology shall be authorized to direct or make partial drawings, and multiple successive drawings, upon the credit account. The Corps and Ecology shall have the exclusive authority to direct disbursement of funds from the credit funds account, and the direction of only one of these two agencies is required in order to accomplish a disbursement.
- C. Each Letter of Credit for Construction shall acknowledge that, from time to time, the Beneficiary agencies may authorize a reduction in the required level of credit during the effective period of the Letter of Credit. Any such reduction must be authorized by both the Corps and Ecology, as Beneficiary agencies. Upon receipt of both authorizations, in writing on agency letterhead, the issuing financial institution will be authorized to reduce the level of maximum extended credit, and it may, as arranged between Skykomish Habitat and the issuing financial institution, reissue or amend the applicable Letter of Credit accordingly to reflect that change.
- D. Each Letter of Credit for Construction shall acknowledge that the Beneficiary agencies may authorize cancellation of the Letter of Credit applicable to a designated phase prior to the scheduled expiration date reflected therein. Any such cancellation must be authorized by both the Corps and Ecology, as Beneficiary agencies. Upon receipt of both authorizations, in writing on agency letterhead, the issuing financial institution will be authorized to withdraw or rescind, as arranged between Skykomish Habitat and the issuing financial institution, the applicable Letter of Credit.
- E. If so directed by the Corps and Ecology, Skykomish Habitat agrees to substitute the identification of the Third Party Designee with a replacement entity for each applicable Letter of Credit. The Sponsor agrees that it shall execute either an amendment or replacement of each applicable Letter of Credit in order to effect such a substitution. If substitution of the Third Party Designee is directed, all other terms and conditions of the applicable Letter of Credit shall remain unchanged, particularly including the credit amount and the expiration date.
- F. Upon request of Skykomish Habitat, the Corps and Ecology may authorize reductions in the required credit account limits of each of the Letters of Credit for Construction when the Corps and Ecology have determined, in consultation with the other members of the MBRT and Skykomish Habitat,

## **Appendix 1: Skykomish Habitat Mitigation Banking Instrument**

that the Bank objectives and performance standards reflected in Section 9 of the Appendices are being timely met.

- G. The Sponsor is solely responsible for any costs, fees, or premiums associated with the issuance, modification, continuation in force, or termination of each Letter of Credit. Any such costs may not be deducted from the principal of the Letter of Credit.

### ***17.2 Irrevocable Letter of Credit for Maintenance, Monitoring & Contingencies***

- A. The Irrevocable Letter of Credit prescribed in Articles III.C.2. of this Instrument, underlying the establishment, and functionality of the Bank, will adhere to the following form and contents. Each Letter of Credit for Maintenance, Monitoring, and Contingencies will be irrevocable. Each Letter of Credit may not be withdrawn or canceled by the issuing financial institution prior to the articulated expiration date, which may be no earlier than 11 years from the date of issuance. If the Letter of Credit for Maintenance, Monitoring, and Contingencies applicable to any phase of the Bank shall expire by its own terms prior to the termination of the establishment phase of the Bank as specified in Article IV.L. of this Instrument, Skykomish Habitat must reinitiate an acceptable Letter of Credit so that there is no interval in which there is no financial assurance instrument in effect. No further credits will be awarded from any phase of the Bank while any phase lacks an effective Letter of Credit. Each Letter of Credit will provide that the issuing financial institution shall honor the credit engagement and pay to the Third Party Designee the directed sum without inquiring whether the directing Beneficiary agency or the receiving Third Party Designee has a right to make such a demand, and without acknowledgement of any inconsistent claim of Skykomish Habitat to those funds.
- B. Each Letter of Credit for Maintenance, Monitoring, and Contingencies will be issued to, and will designate, the Corps and Ecology as distinct and independent beneficiaries. Upon the direction of either the Corps or Ecology, in writing on agency letterhead, the issuing financial institution shall disburse from the credit funds account to the Third Party Designee the amount specified by the Corps or Ecology, up to a maximum cumulative amount as reflected in the Letter of Credit. The Corps or Ecology shall be authorized to direct or make partial drawings, and multiple successive drawings, upon the credit account. The Corps and Ecology shall have the exclusive authority to direct disbursement of funds from the credit funds account, and the direction of only one of these two agencies is required in order to accomplish a disbursement.

## **Appendix 1: Skykomish Habitat Mitigation Banking Instrument**

- C. Each Letter of Credit for Maintenance, Monitoring, and Contingencies shall acknowledge that, from time to time, the Beneficiary agencies may authorize a reduction in the required level of credit during the effective period of the Letter of Credit. Any such reduction must be authorized by both the Corps and Ecology, as Beneficiary agencies. Upon receipt of both authorizations, in writing on agency letterhead, the issuing financial institution will be authorized to reduce the level of maximum extended credit, and it may, as arranged between Skykomish Habitat and the issuing financial institution, reissue or amend the applicable Letter of Credit accordingly to reflect that change.
- D. Each Letter of Credit for Maintenance, Monitoring, and Contingencies shall acknowledge that the Beneficiary agencies may authorize cancellation of the Letter of Credit applicable to a designated phase prior to the scheduled expiration date reflected therein. Any such cancellation must be authorized by both the Corps and Ecology, as Beneficiary agencies. Upon receipt of both authorizations, in writing on agency letterhead, the issuing financial institution will be authorized to withdraw or rescind, as arranged between Skykomish Habitat and the issuing financial institution, the applicable Letter of Credit.
- E. If so directed by the Corps and Ecology, Skykomish Habitat agrees to substitute the identification of the Third Party Designee with a replacement entity for each applicable Letter of Credit. The Sponsor agrees that it shall execute either an amendment or replacement of each applicable Letter of Credit in order to effect such a substitution. If substitution of the Third Party Designee is directed, all other terms and conditions of the applicable Letter of Credit shall remain unchanged, particularly including the credit amount and the expiration date.
- F. Upon request of Skykomish Habitat, the Corps and Ecology may authorize reductions in the required credit account limits of each of the Letters of Credit for Maintenance, Monitoring, and Contingencies when the Corps and Ecology have determined, in consultation with the other members of the MBRT and Skykomish Habitat, that the Bank objectives and performance standards reflected in Section 9 of the Appendices are being timely met.
- G. The Sponsor is solely responsible for any costs, fees, or premiums associated with the issuance, modification, continuation in force, or termination of each Letter of Credit. Any such costs may not be deducted from the principal of the Letter of Credit.

## **Appendix 1: Skykomish Habitat Mitigation Banking Instrument**

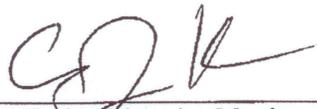
### **18 Modification of the Provisions of This Appendix**

The provisions of this Appendix may be modified as mutually agreed to by Skykomish Habitat and the MBRT. All changes that may be proposed and/or adopted must follow the procedures provided within Article VI.B., and any other applicable requirements of this Instrument.

Appendix 1: Skykomish Habitat Mitigation Banking Instrument

CONCURRENCE RECORD:

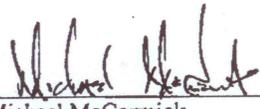
The following agencies and Skykomish Habitat Representatives have concurred with the content presented within this Appendix to the Skykomish Habitat Mitigation Bank Instrument

  
\_\_\_\_\_  
Eric J. Kaplan, Managing Member  
Skykomish Habitat, LLC

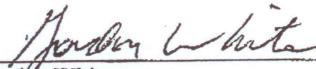
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Date

  
\_\_\_\_\_  
David G. Remlinger, Managing Member  
Skykomish Habitat, LLC

8-16-06  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Michael McCormick  
Colonel, Corps of Engineers  
District Engineer

8/16/06  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Gordon White  
Manager, Shorelands and Environmental Assistance Program  
Washington State Department of Ecology

8/24/06  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Richard B. Parkin  
Acting Director, Office of Ecosystems, Tribal & Public Affairs  
U.S. Environmental Protection Agency, Region X

8/16/06  
\_\_\_\_\_  
Date

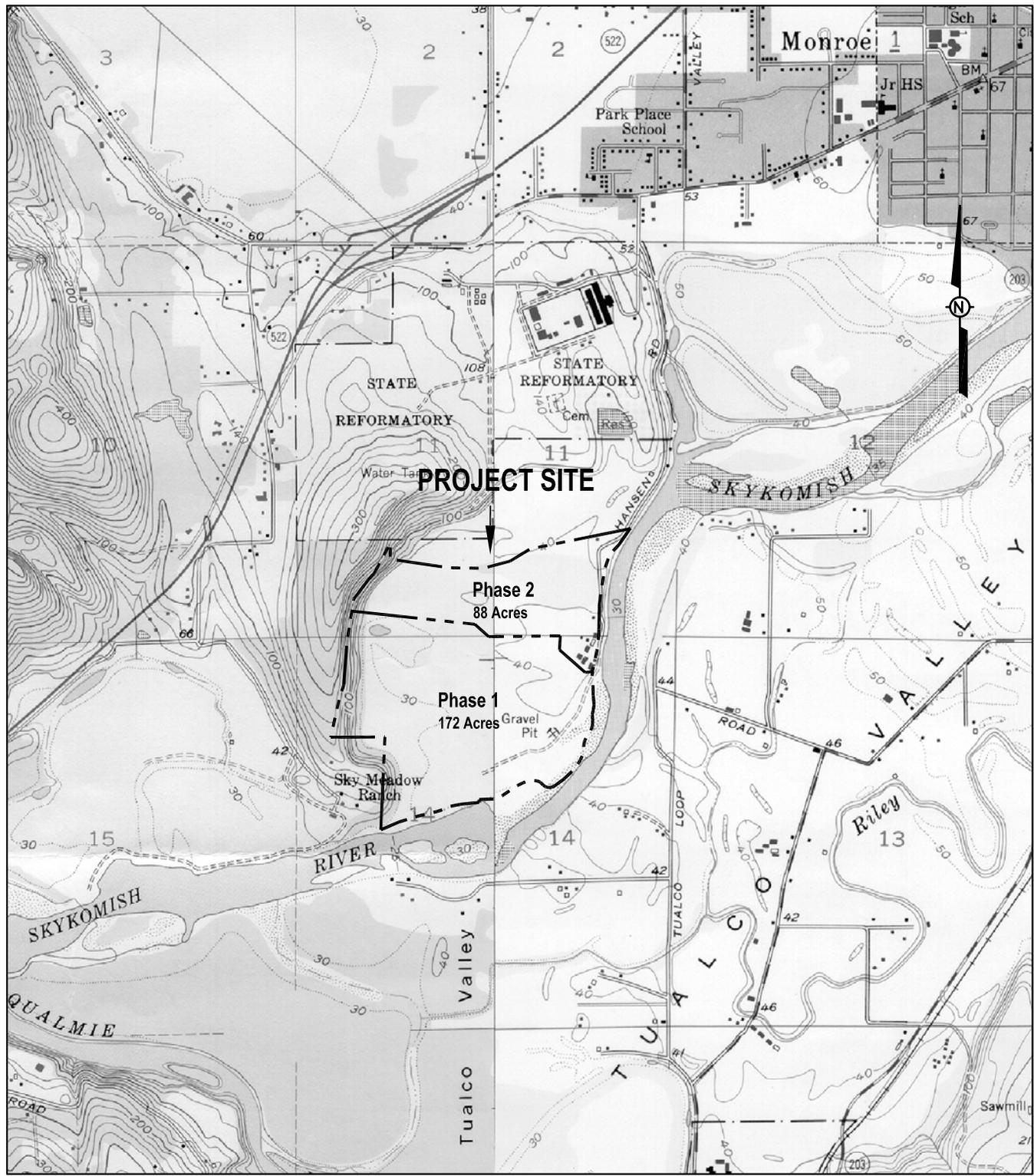
  
\_\_\_\_\_  
Rich Doenges  
Manager, Aquatic Division  
Washington State Department of Natural Resources

8/14/06  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Craig R. Ladisler,  
Director, Department of Planning and Development Services  
Snohomish County

8/14/06  
\_\_\_\_\_  
Date

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**CHECKED BY** SC 3/21/06  
**APPROVED BY** KWW 3/21/06  
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**DRAWING NUMBER** 114731.04



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SCALE

**SOURCE:**  
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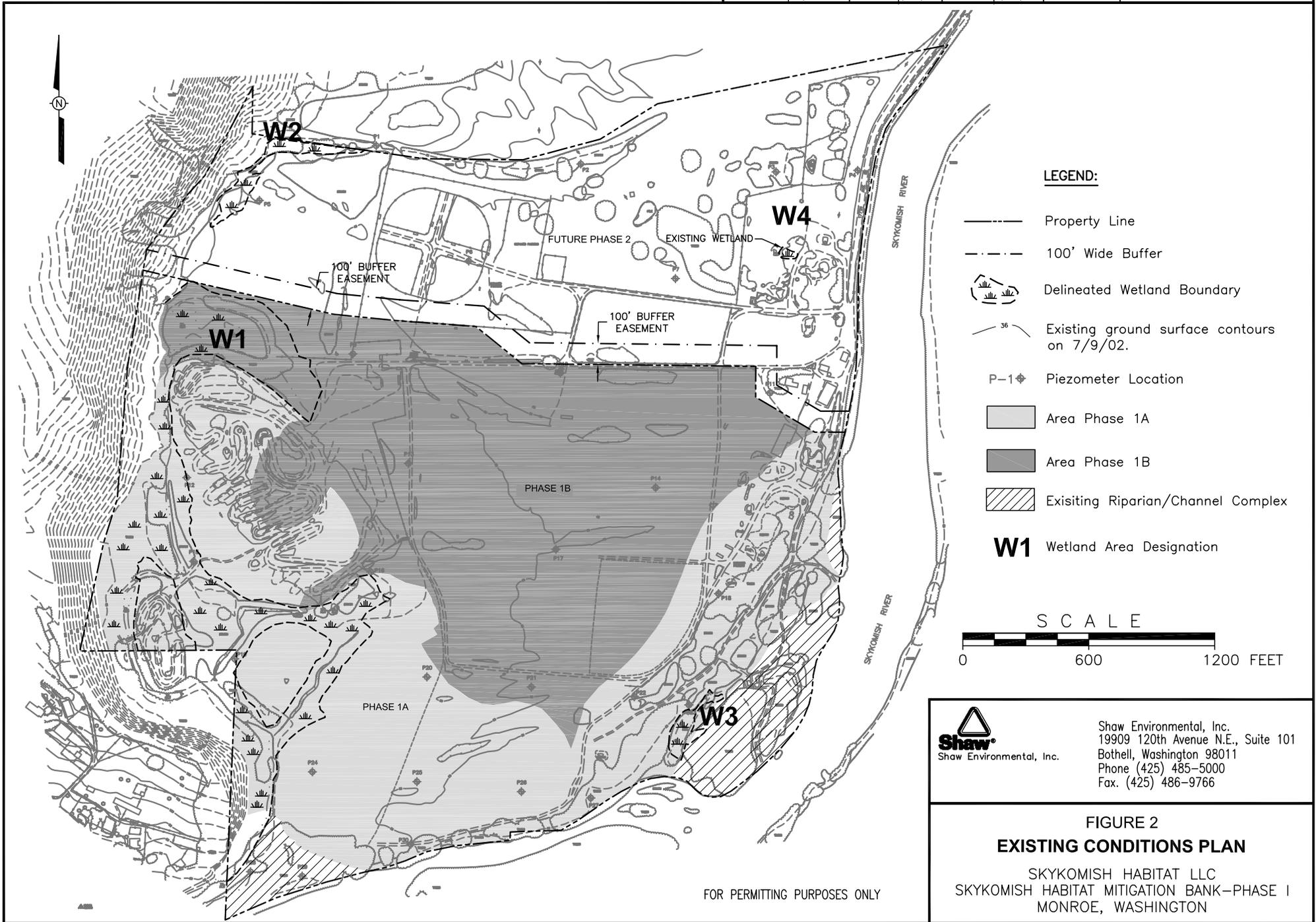
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 Bothell, Washington 98011  
 Phone (425) 485-5000  
 Fax. (425) 486-9766

**FIGURE 1**  
**SITE LOCATION MAP**  
 SKYKOMISH HABITAT LLC  
 SKYKOMISH HABITAT MITIGATION BANK-PHASE 1  
 MONROE, WASHINGTON

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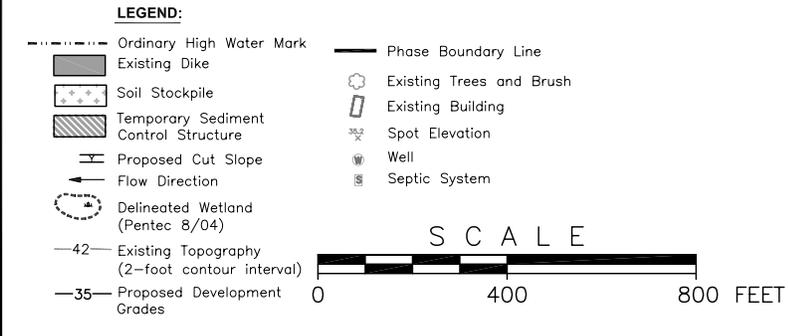
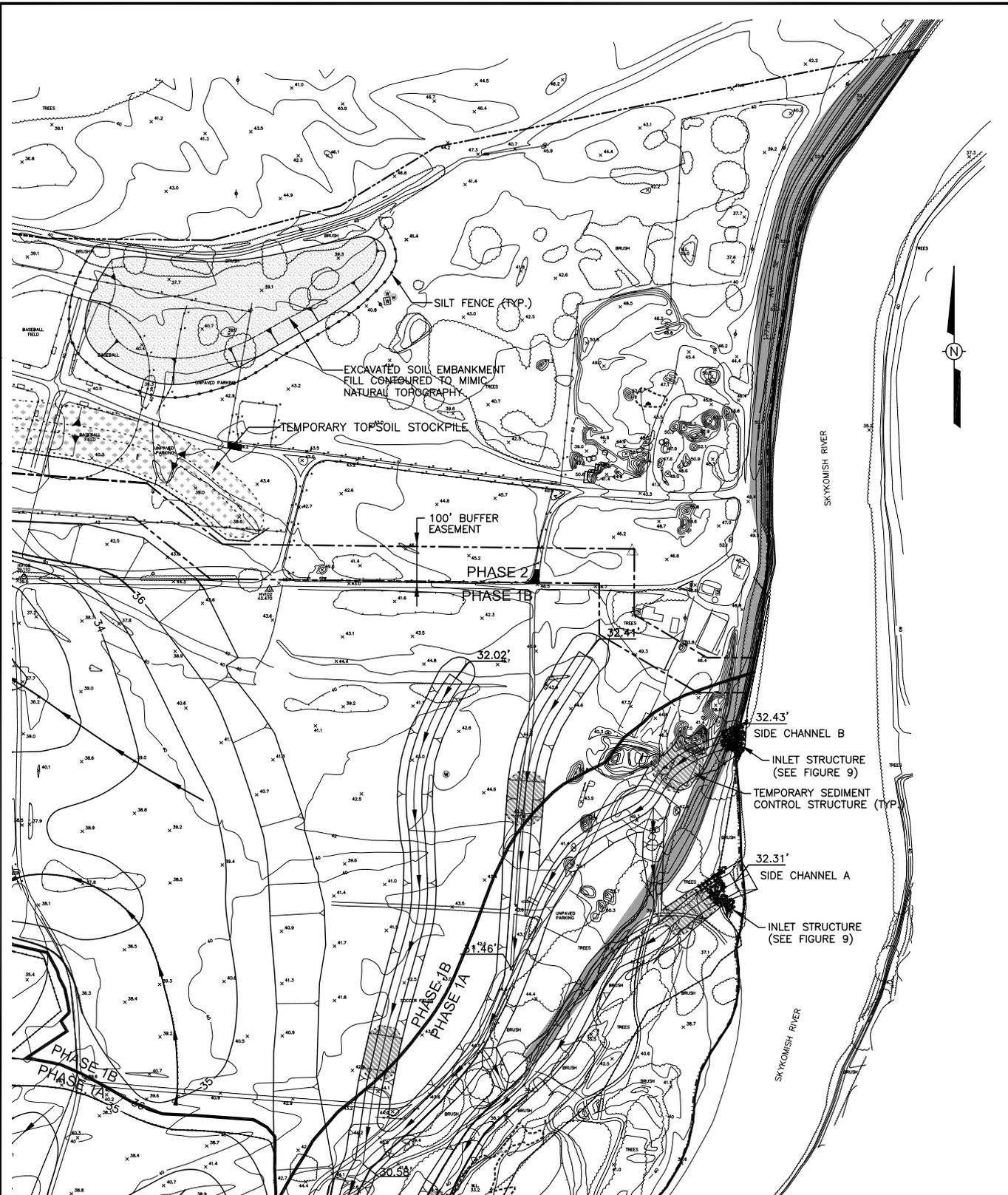
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KWW 3/21/06

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MLP 3/2006

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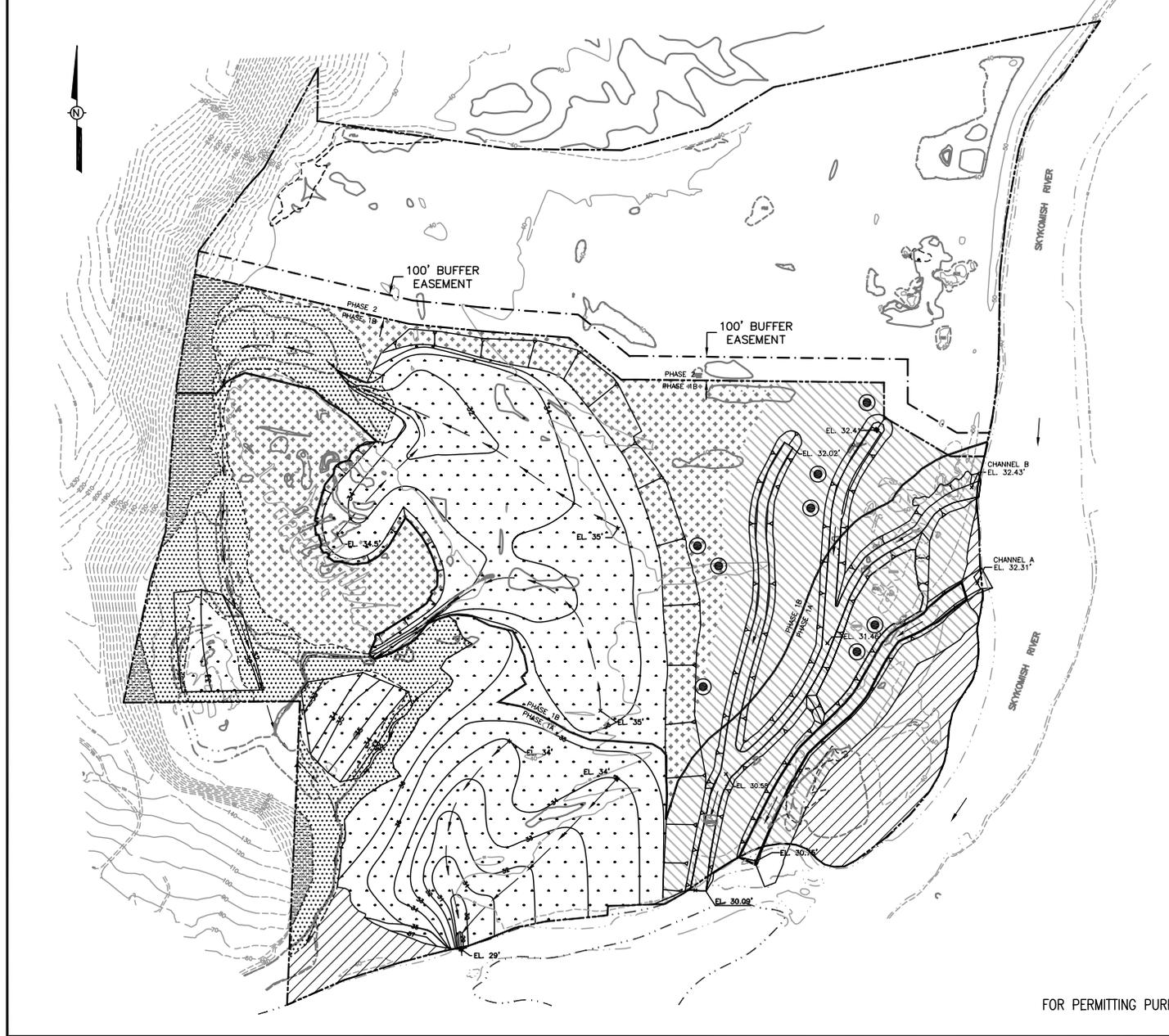


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**FIGURE 2A**  
**CHANNEL INLET AND DIKE DETAIL**  
 SKYKOMISH HABITAT LLC  
 SKYKOMISH HABITAT MITIGATION BANK-PHASE 1  
 MONROE, WASHINGTON

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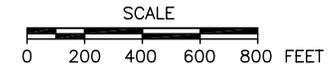
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Habitat Component	Phase 1A Acreage	Phase 1B Acreage	Phase 1 (Total) Acreage
Wetland Rehabilitation	14.9	5.5	20.4
Wetland Creation	31.3	34.8	66.1
Upland Enhancement	14.2	15.9	30.1
Riparian/Channel Complex	24.1	15.8	39.9
Riparian/Channel Complex Enhancement	11.0	0	11.0
Slope Preservation Area	2.9	1.6	4.5
<b>Totals</b>	<b>98.4</b>	<b>73.6</b>	<b>172.0</b>

**LEGEND:**

- Flow Line and Direction
- Cut Slopes
- 36 Existing ground surface contours on 7/9/02.
- 34 Proposed Contours
- Property Line
- Delineated Wetland Boundary
- Ordinary High Water Mark
- Phase Boundary
- 100' Wide Buffer
- Raptor Perch (See Detail 5, Figure 8)

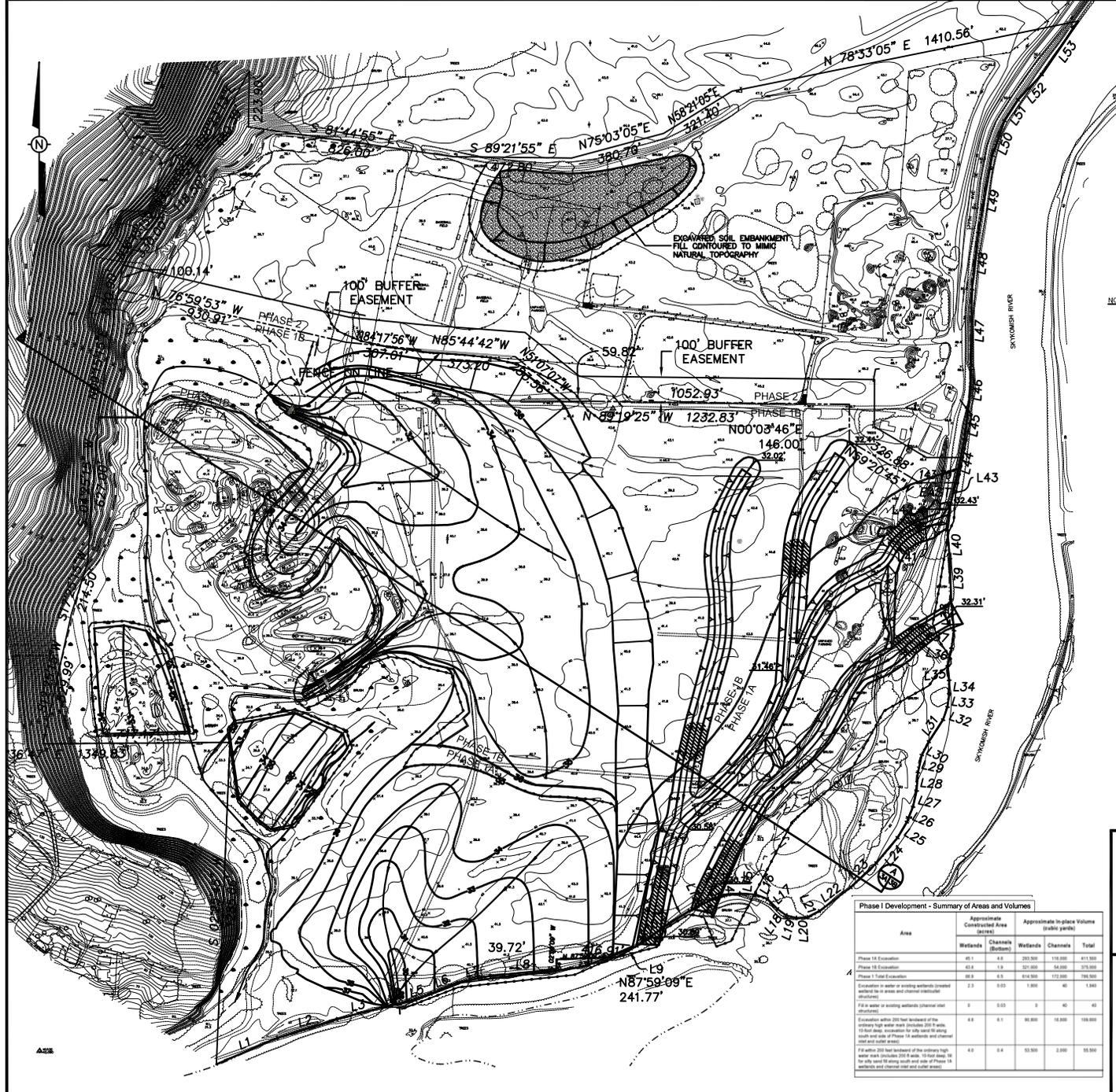


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**FIGURE 3**  
**HABITAT AND GRADING PLAN**  
 SKYKOMISH HABITAT LLC  
 HABITAT MITIGATION BANK—PHASE 1  
 MONROE, WASHINGTON

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- LEGEND:**
- Property Line
  - Phase Boundary Lines
  - L1 Property Line Segment (Refer to Figure 13)
  - 100 FT Wide Buffer
  - 100-Year Flood Plain
  - Proposed Silt Fence
  - Silt Fences
  - Ordinary High Water Mark
  - Temporary Sediment Control Structures
  - Proposed Flowline and Direction
  - Stabilized Construction Entrance
  - Proposed Cut Slope
  - Proposed Fill Slope
  - Delineated Wetland (Pentec 8/04)
  - Existing Topography (2-foot contour interval)
  - Proposed development grades
  - Existing Trees and Brush
  - Existing Building
  - Spot Elevation
  - Existing Haul Roads
  - Wall
  - Sepic System
  - Survey Control Point

- NOTES:**
- The 100-yr floodplain was obtained from Table 2 in the Hydraulic Modeling Analysis of Skykomish River prepared by Montgomery Water Group (Basis of Design Report, Appendix C-2, Sept. 2, 2004).
  - The ordinary high water mark (OHWM) was delineated in the field with the assistance of aerial photo interpretation on June 25, 2004 by a certified professional wetland scientist (Pentec) with the oversight of district and regional representatives of the U.S. Army Corps of Engineers.
  - The property line was surveyed by Hansen and Associates, Inc.
  - This existing topography shown was produced by Walker & Associates and W&H Pacific according to procedures that have been demonstrated to comply with the National Standard for Spatial Data Accuracy (NSSDA) for horizontal and vertical accuracy for a scale of 1"=100'. Mapping from photography flown on July 9, 2002. The horizontal datum used was the North American Datum of 1983-1991 (NAD 83-91). The vertical datum used was North American Vertical Datum of 1988 (NAVD 88). To convert to NGVD 1929 datum subtract 3.76 ft. The presence of dashed contours indicate that the ground is obscured by buildings, vegetation or shadows and does not meet NSSDA specifications.
  - Phase 1 will be constructed in two construction seasons, Phase 1A and Phase 1B.
  - Phase 1A will be constructed in the southern area of the site during the first construction season. As project economics allow, the Phase 1B area will be constructed in the following construction season. The general construction sequence for each Phase will be:
    - Stake out and fence project limits (Stake Fences)
    - Install Temporary Stormwater and Erosion Controls (Silt Fences, Detention Basins)
    - Construct Access Roads, Staging Areas and Stockpile Areas
    - Stripping and Stockpiling of Topsoil
    - Excavation and Grading (Shown as Bold Contours and Cur Slopes)
    - Placement of soil in planting areas.
    - Planting and Soil Stabilization (trees, shrubs, hydroseeding)
    - Connection of Constructed Wetlands and Channels to River and/or existing channels and wetlands
    - Removal of Temporary Stormwater and Erosion Controls
 All work within the ordinary high water mark will be completed between July 15 and September 15.
  - The top of bank elevations for the proposed channels and wetland will meet existing ground elevations as shown.



Phase I Development - Summary of Areas and Volumes

Area	Approximate Contour Area (acres)		Approximate In-place Volume (cubic yards)		
	Wetlands	Channels (Bottom)	Wetlands	Channels	Total
Phase 1A Excavation	41	1.1	203,500	118,000	421,500
Phase 1B Excavation	42	1.8	221,000	68,000	289,000
Phase 1C Excavation	28	2.3	143,000	171,000	314,000
Construction water in existing wetlands (contour elevation for water and channel material)	2.2	0.00	1,000	46	1,046
Fill in water in existing wetlands (channel bed elevation)	0	0.00	0	46	46
Construction water 200 feet behind of the 100-year high water mark (100-year high water mark elevation for July used for filling depth and depth of 14 wetlands and channel material (total trees)	0.0	0.1	80,000	18,000	98,000
Fill in water 200 feet behind of the 100-year high water mark (200 feet behind of the 100-year high water mark elevation for July used for filling depth and depth of 14 wetlands and channel material and channel material)	0.0	0.0	0	0	0

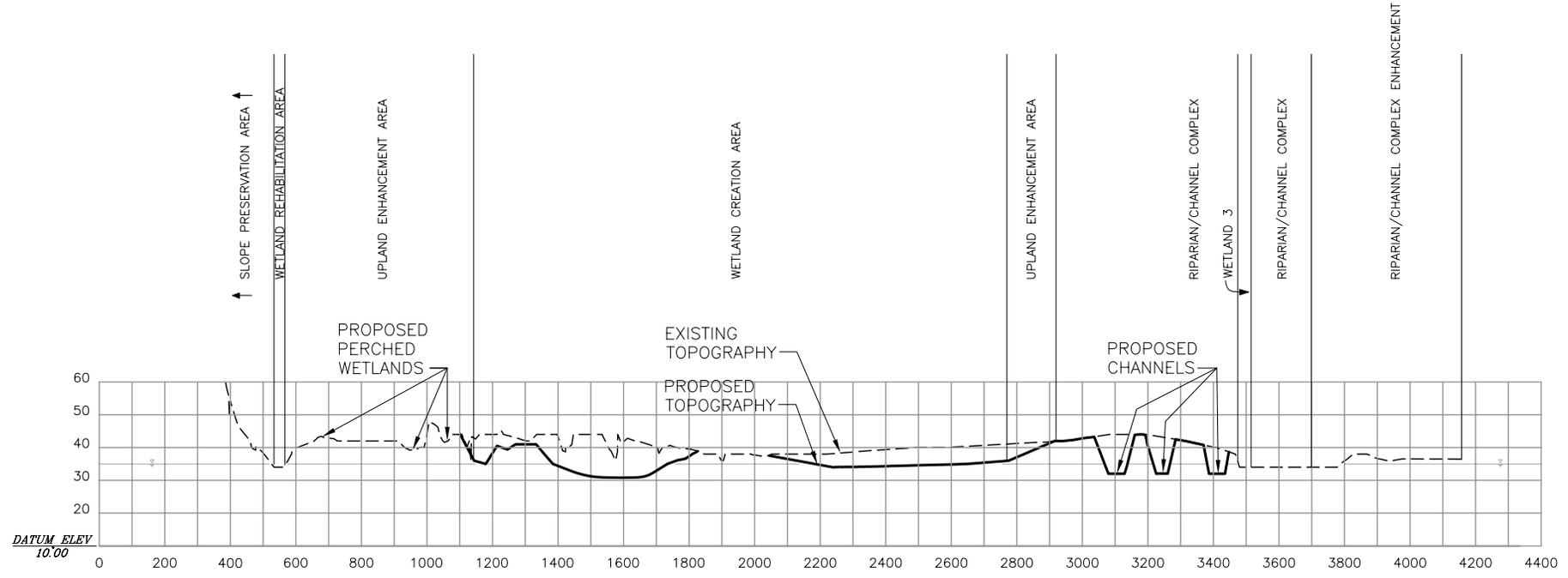
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**FIGURE 3A**  
**DETAILED GRADING PLAN**  
SKYKOMISH HABITAT LLC  
SKYKOMISH HABITAT MITIGATION BANK-PHASE 1  
MONROE, WASHINGTON

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- LEGEND:**
- Existing Ground
  - Proposed Grade
  - Average Groundwater Level During Growing Season (Elevation = 35')

**CROSS SECTION**

HORIZ. SCALE: 1" = 500'  
VERT. EXAGGERATION X 10



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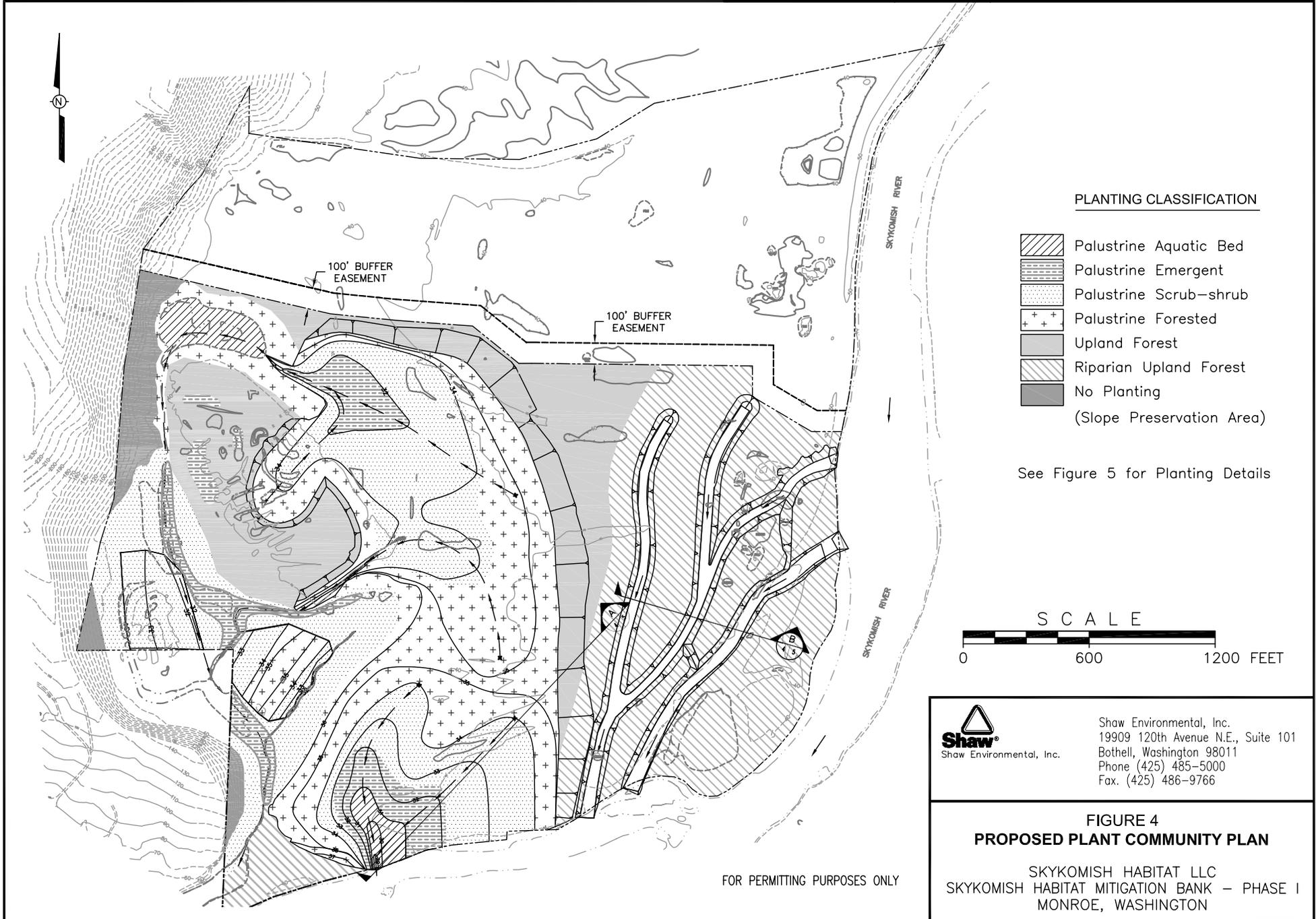
**FIGURE 3B**  
**PROJECT CROSS SECTION**

ACADEMY HOLDINGS  
SKYKOMISH HABITAT MITIGATION BANK—PHASE I  
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**PLANTING CLASSIFICATION**

-  Palustrine Aquatic Bed
-  Palustrine Emergent
-  Palustrine Scrub-shrub
-  Palustrine Forested
-  Upland Forest
-  Riparian Upland Forest
-  No Planting  
(Slope Preservation Area)

See Figure 5 for Planting Details



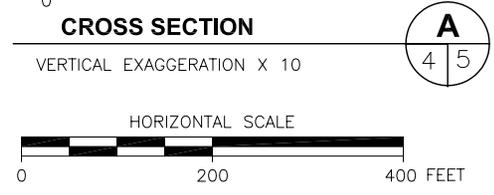
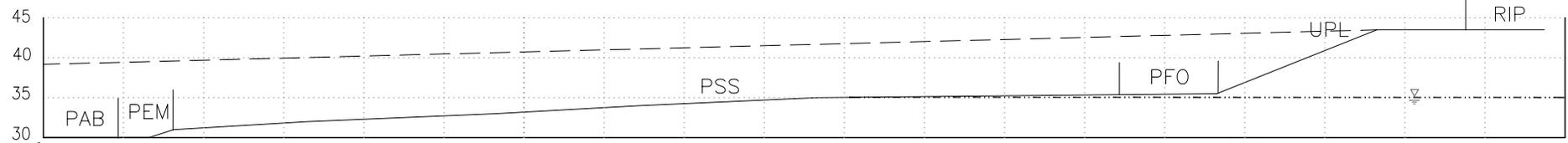
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**FIGURE 4  
PROPOSED PLANT COMMUNITY PLAN**

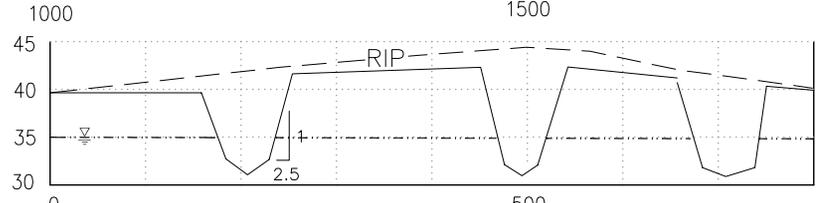
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SKYKOMISH HABITAT MITIGATION BANK - PHASE I  
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**LEGEND:**  
 - - - Existing Ground  
 — Proposed Grade  
 - - - ∇ - Average Groundwater Level During Growing Season (Elevation = 35)



	Name: PAB	Zone*	Name: PEM	Zone*	Name: PSS	Zone*	Name: PFO	Zone*	Name: UPL	Zone*	Name: RIP	Zone*
Typical Unit Cell	Δ Δ l l l		g g k k k k k k		w w p p r r t t		A A A A C P u u u u S		M M A A A A H H H H E E		B A A C C w w w w	
Wetland Class	Palustrine Aquatic Bed		Palustrine Emergent		Palustrine Shrub-Scrub		Palustrine Forested		Upland Forest		Riparian Upland Forest	
Hydrologic Region	Permanently flooded		Semi-permanently flooded		Seasonally flooded/saturated		Seasonally saturated/frequently flooded		Seasonally saturated/frequently flooded		Seasonally saturated/frequently flooded	
Acres Created	1.4		5.6		23.6		33.4		0		32.8	
Acres Enhanced	2.1		4.1		15.2		1.7		28.3		12.9	
Acres Total	3.5		9.7		38.8		35.1		28.3		45.7	

- NOTES:**
- Planting zones are shown on Figure 4.
  - Codes refer to unit cell boundaries shown on Figure 4.
  - Overall planting densities will be:  
 Forested Areas (PFO, UPL, RIP)  
 523 trees/acre (30% conifers);  
 1,220 shrubs/acre;  
 Shrub Community (PSS)  
 1,740 shrubs/acre;  
 Emergent (herb) Community (PEM)  
 19,000 plants/acre  
 For Relative Abundance Per Plant Type, See Tables 4-1, 4-2 and 4-3 in the Basis of Design Report.  
 Aquatic Bed (PAB)  
 4,840 plants/acre
  - For the enhancement areas, the overall planting densities represent year 10 densities and include existing plants. Planting in enhancement areas may not occur within the first two years during control of invasive plants.
  - No planting will occur within the approximate 4.7-acre slope preservation area or the 6.4-acre channel bottom area.

	TAXONOMIC NAME	COMMON NAME	TYPE
TREES	M Acer macrophyllum	Big leaf maple	Bare root or 2 gal.
	A Alnus rubra	Red alder	Bare root or 2 gal.
	S Picea sitchensis	Sitka spruce	Bare root
	C Populus balsamifera	Black cottonwood	Bare root or 2 gal.
	E Pseudotsuga menziesii	Douglas fir	5 gal. or ball & burlap
SHRUBS	B Thuja plicata	Western red cedar	Bare root
	H Tsuga heterophylla	Western hemlock	2 gal., or ball & burlap
	d Cornus sericea	Red-osier dogwood	Bare root or 1 gal.
	t Lonicera involucrata	Black twinberry	Bare root or 1 gal.
	r Rosa pisocarpa	Clustered rose	Bare root or 1 gal.
	u Rubus spectabilis	Salmonberry	Bare root or 1 gal.
	p Salix lucida	Pacific willow	Live stake
	w Salix sitchensis	Sitka willow	Live stake
	o Symphoricarpos albus	Snowberry	Bare root or 1 gal.
	HERBS	x Carex obnupta	Slough sedge
k Eleocharis palustris		Creeping spikerush	4 in. plug
g Juncus ensifolius		Dagger leaf rush	4 in. plug
l Nuphar luteum		Yellow pond-lily	Bare root or 4 in. plug
Δ Potamogeton amplifolius		Large leaf pondweed	Bare root or plug
~ Sagittaria latifolia		Wapato	Bare root or plug
b Scirpus microcarpus		Small-fruited bullrush	4 in. plug



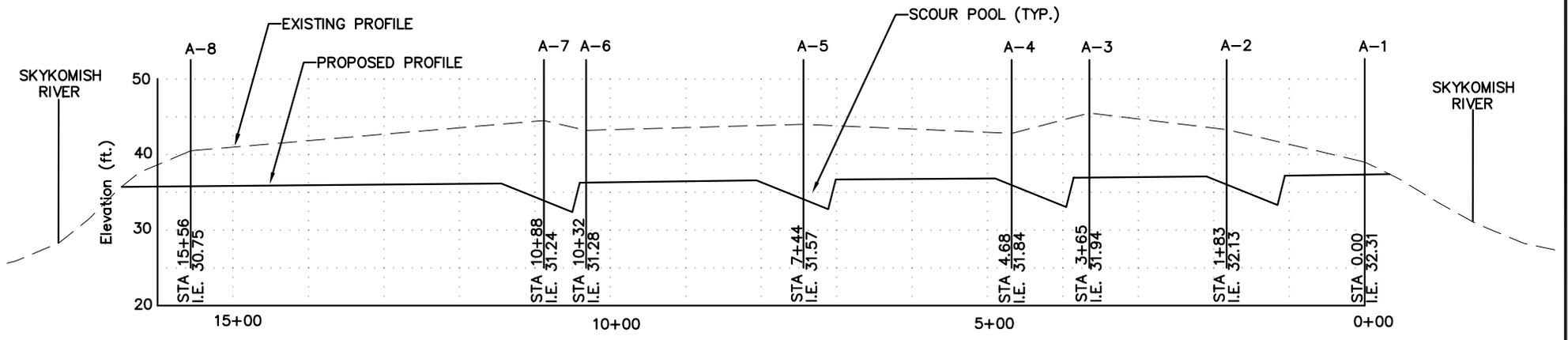
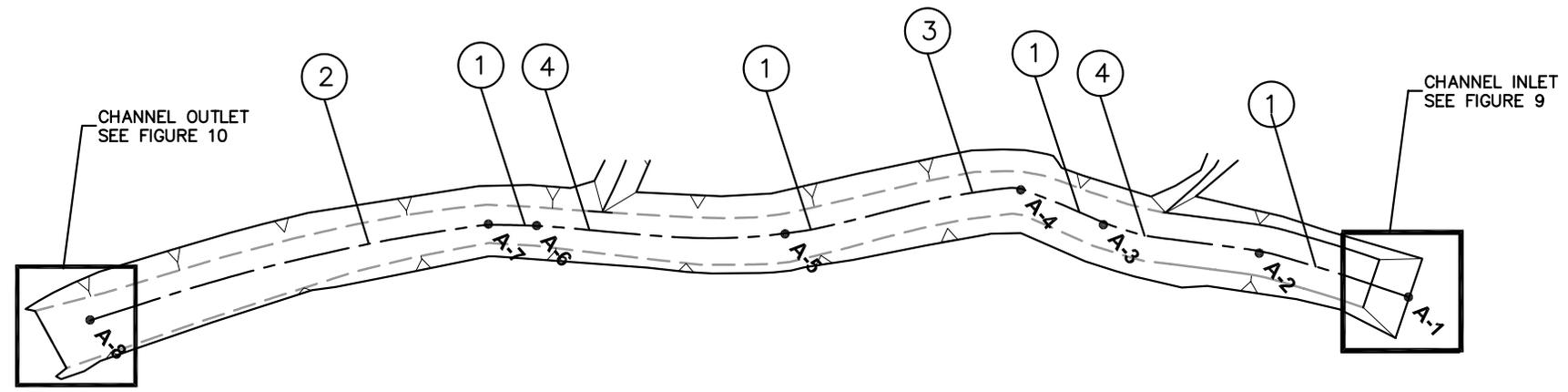
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**FIGURE 5**  
**PLANTING DETAILS**  
 ACADEMY HOLDINGS  
 SKYKOMISH HABITAT MITIGATION BANK-PHASE I  
 MONROE, WASHINGTON

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**FIGURE 6**  
**CHANNEL A SITE PLAN - PROFILE**

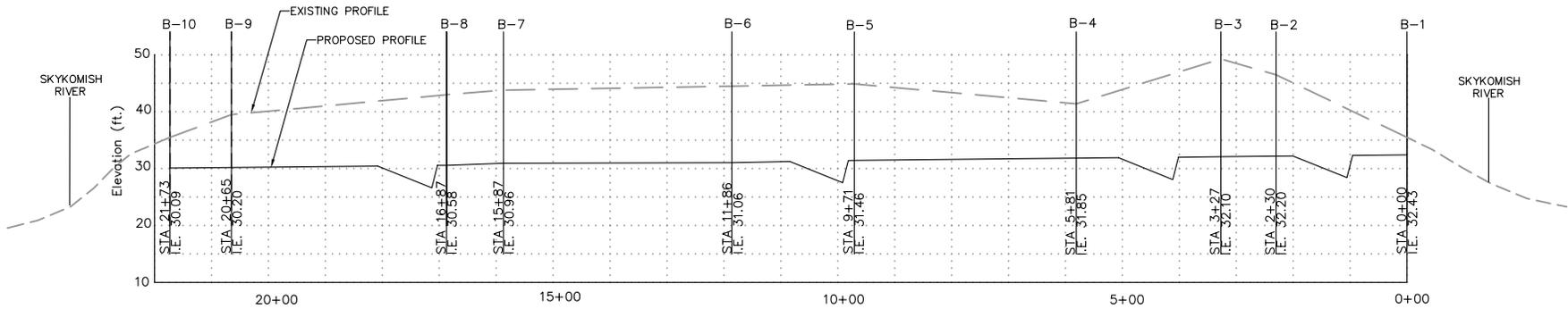
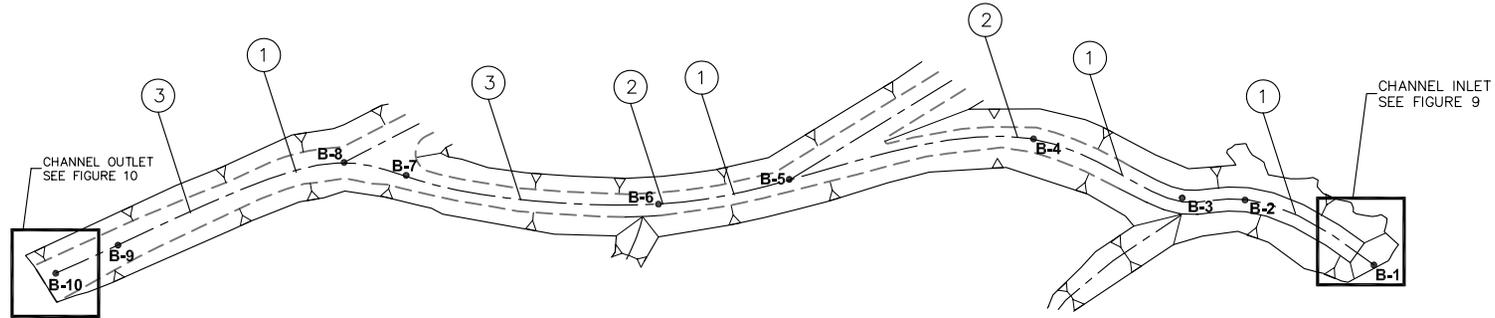
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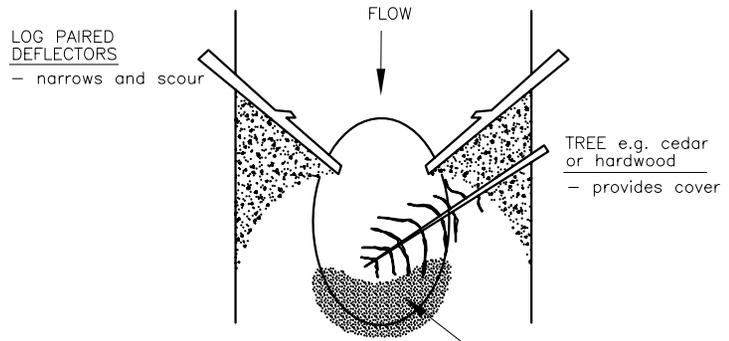

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Bothell, Washington 98011  
Phone (425) 485-5000  
Fax. (425) 486-9766

**FIGURE 7**  
**CHANNEL B SITE PLAN - PROFILE**

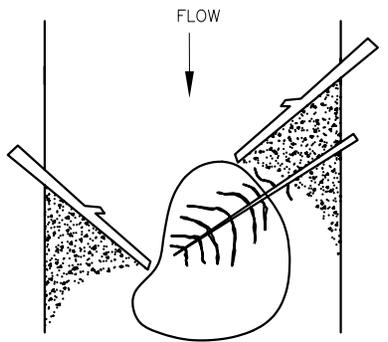
SKYKOMISH HABITAT LLC  
SKYKOMISH HABITAT MITIGATION BANK - PHASE I  
MONROE, WASHINGTON

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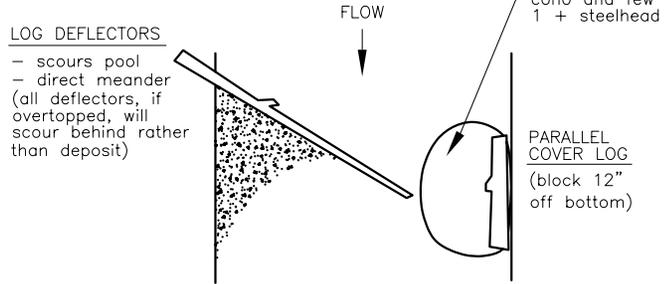
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				<b>BOTHELL</b>
				<b>114731.04</b>



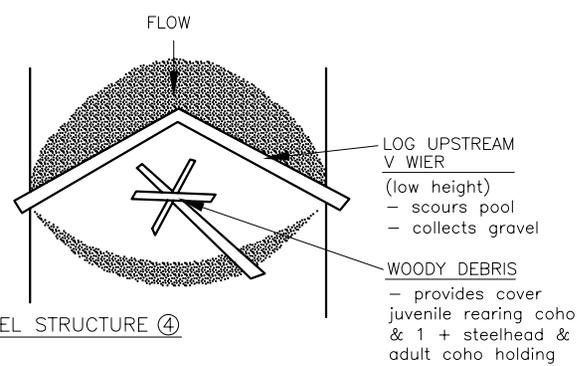
**CHANNEL STRUCTURE ①**



**CHANNEL STRUCTURE ③**



**CHANNEL STRUCTURE ②**



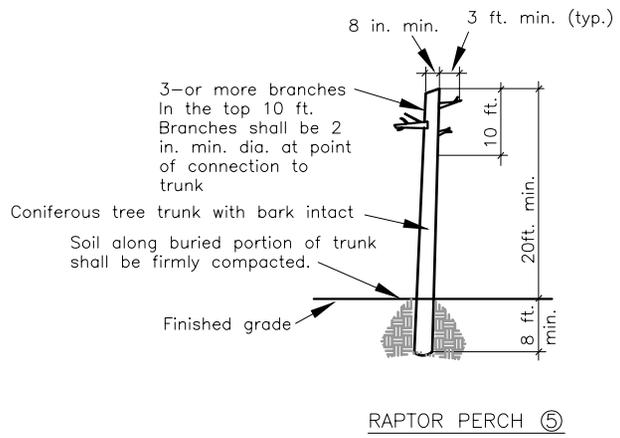
**CHANNEL STRUCTURE ④**

**LEGEND**

- Spawning gravel
- Pool
- Deposition

**NOTES**

1. These structures are 4th order - 1% gradient, sand and gravel substrate, with some bedrock for coho and few steelhead
2. Details are not to scale
3. LWD pieces shall be a single log with a minimum diameter of 1 foot
4. Final channel structure dimensions will be determined prior to construction



**RAPTOR PERCH ⑤**

**NOTES:**

1. Branches shall be existing naturally attached to trunk.
2. Branches shall be spread around trunk and not all on one side.
3. Trunk shall be vertical and perpendicular to ground surface.

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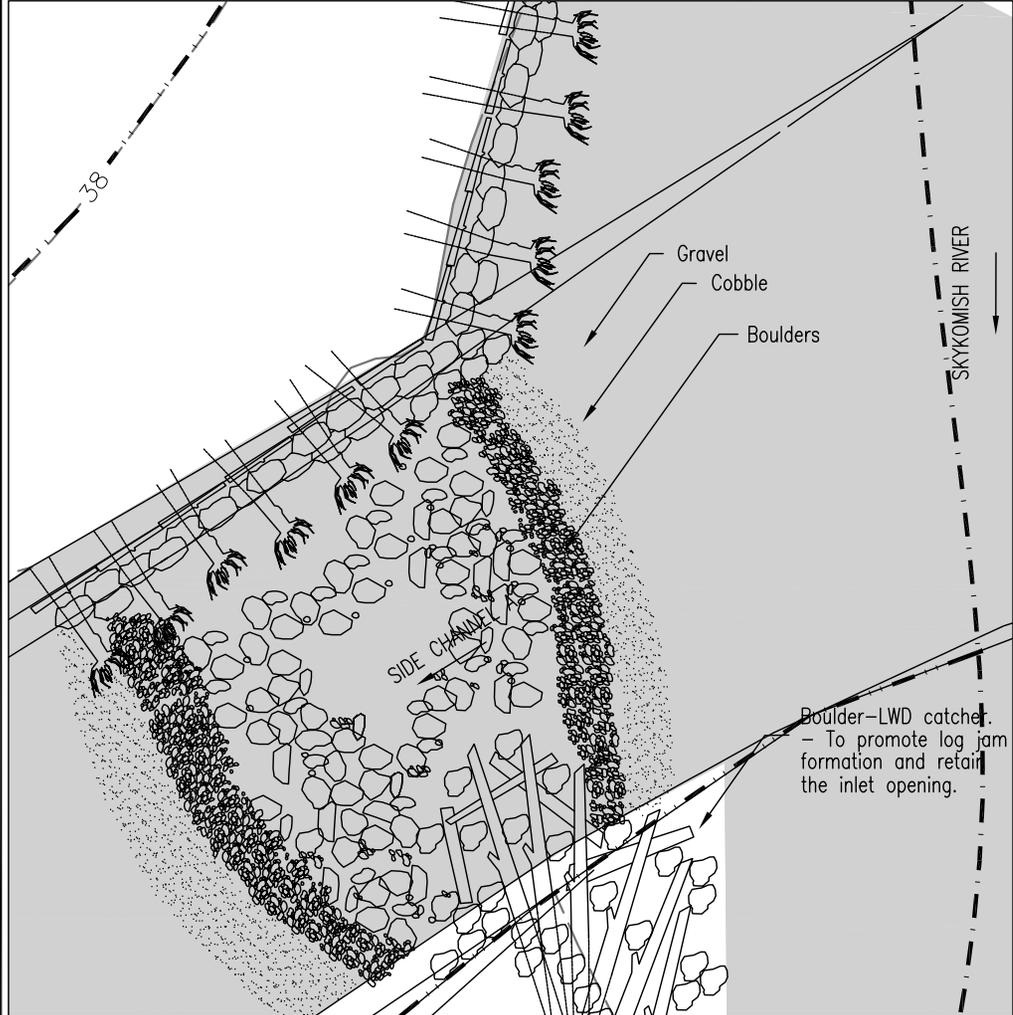
**FIGURE 8**  
**CHANNEL STRUCTURE DETAILS**

ACADEMY HOLDINGS  
 SKYKOMISH HABITAT MITIGATION BANK - PHASE I  
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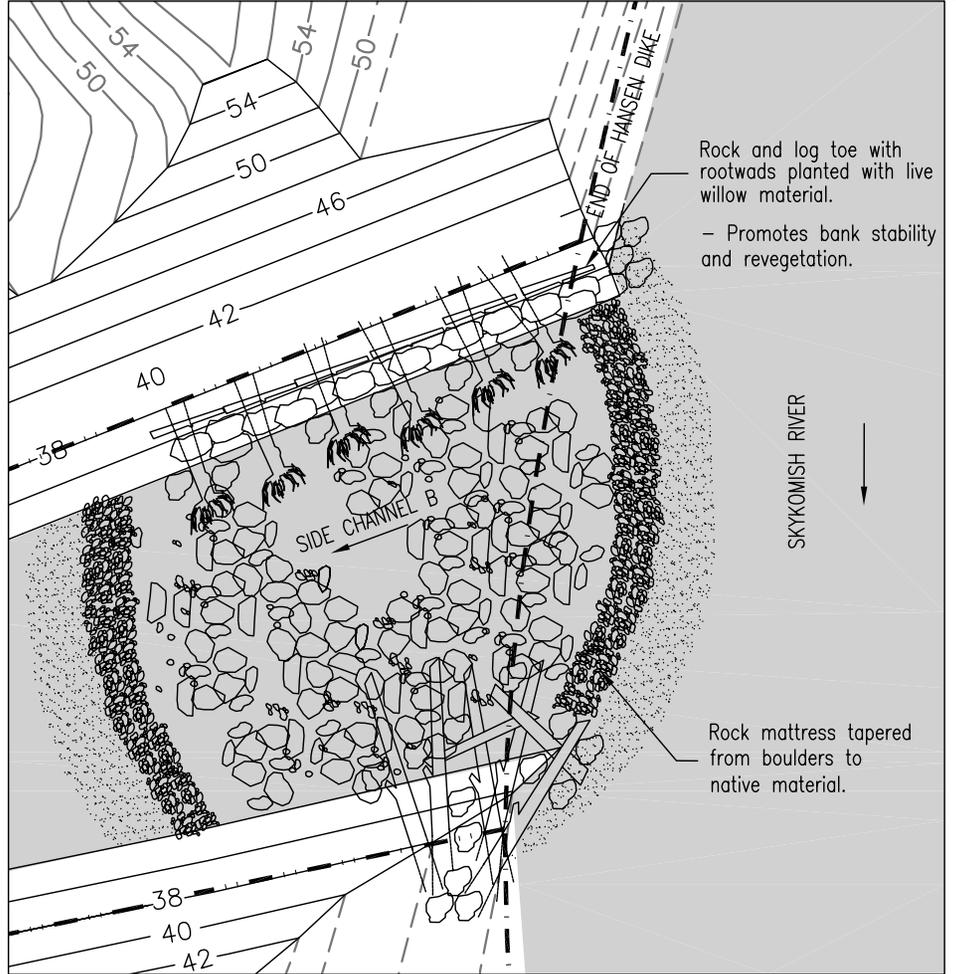
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**CHANNEL A INLET PLAN**



**CHANNEL B INLET PLAN**

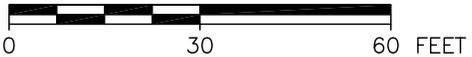


- - - - Existing Ordinary High Water Mark (OHWM) Based on Observations
- - - - Predicted OHWM (See Note)

- 38- Existing Contour
- 40- Proposed Contour

NOTE: Predicted OHWM elevation estimated based on river hydrology and elevation of existing OHWM.  
OHWM will be determined in the field after construction, using both hydrologic and vegetative indicators.

SCALE



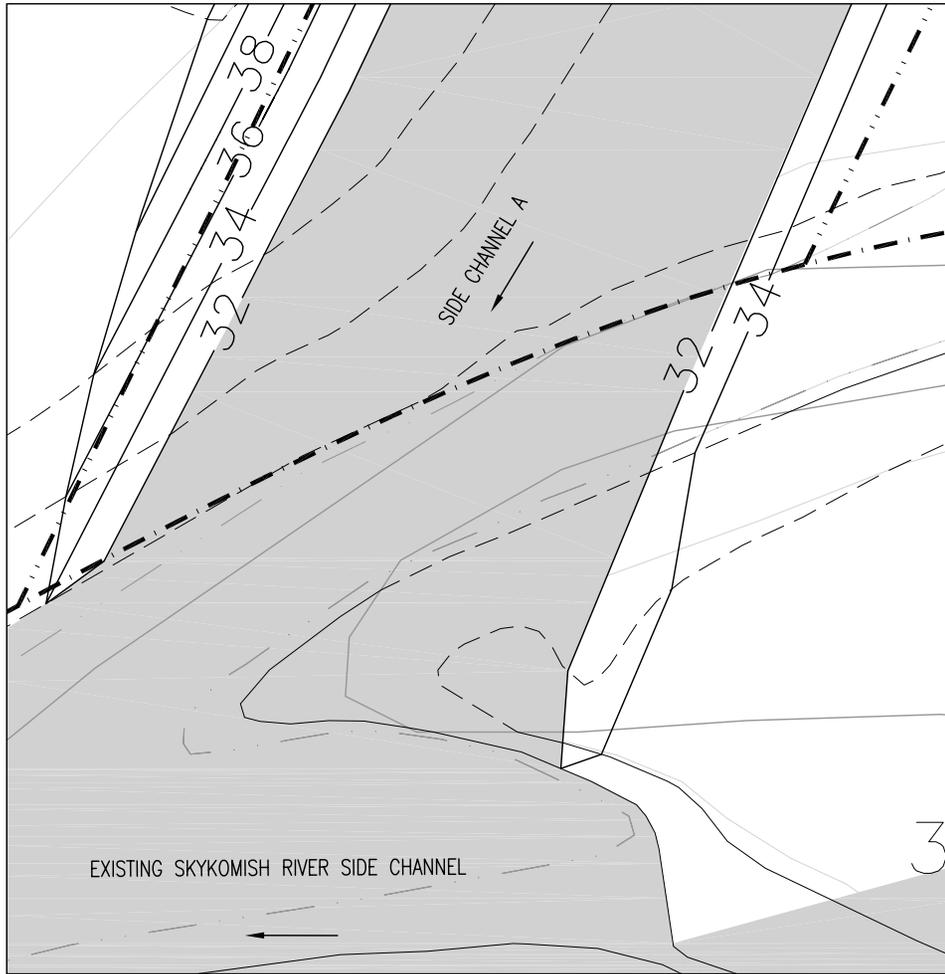
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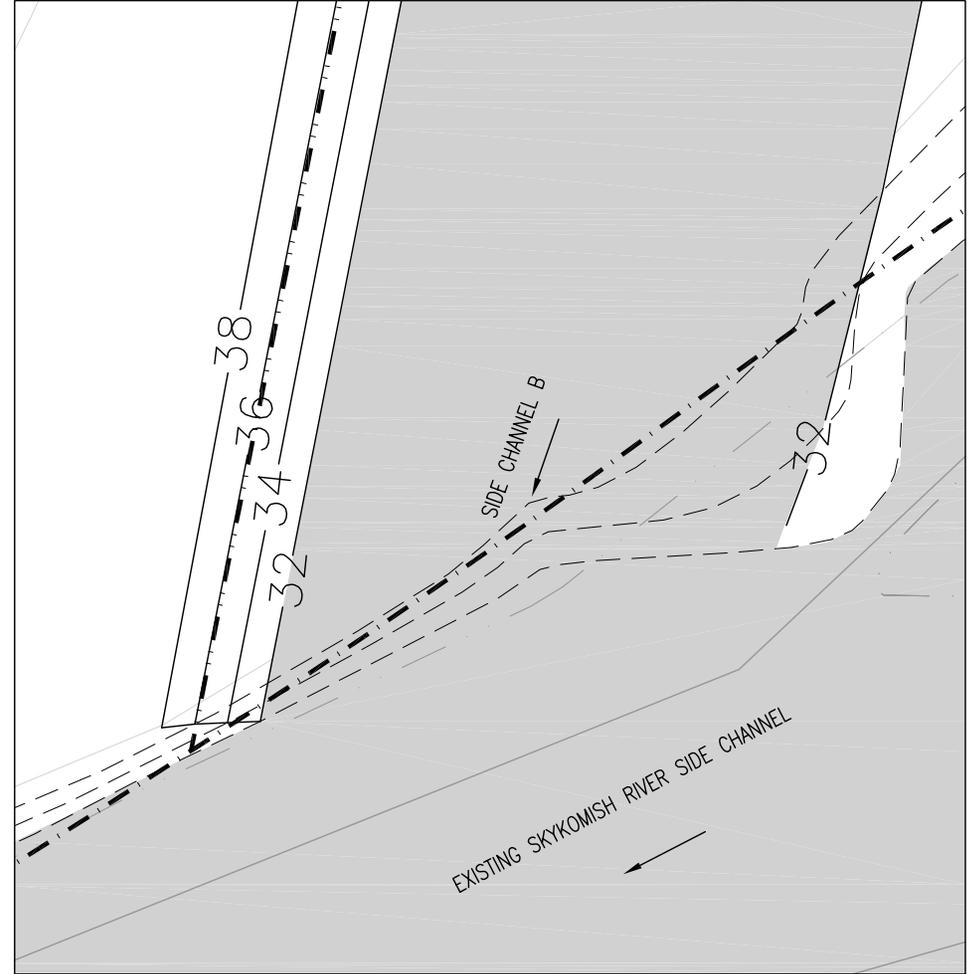
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**FIGURE 9**  
**CHANNEL HYDRAULICS DETAILS**  
**INLETS**  
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SKYKOMISH HABITAT MITIGATION BANK - PHASE I  
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**CHANNEL A OUTLET PLAN**



**CHANNEL B OUTLET PLAN**

- Existing Ordinary High Water Mark (OHWM) Based on Observations
- · - · - Predicted OHWM (See Note)

NOTE: Predicted OHWM elevation estimated based on river hydrology and elevation of existing OHWM.  
OHWM will be determined in the field after construction, using both hydrologic and vegetative indicators.



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Shaw Environmental, Inc.

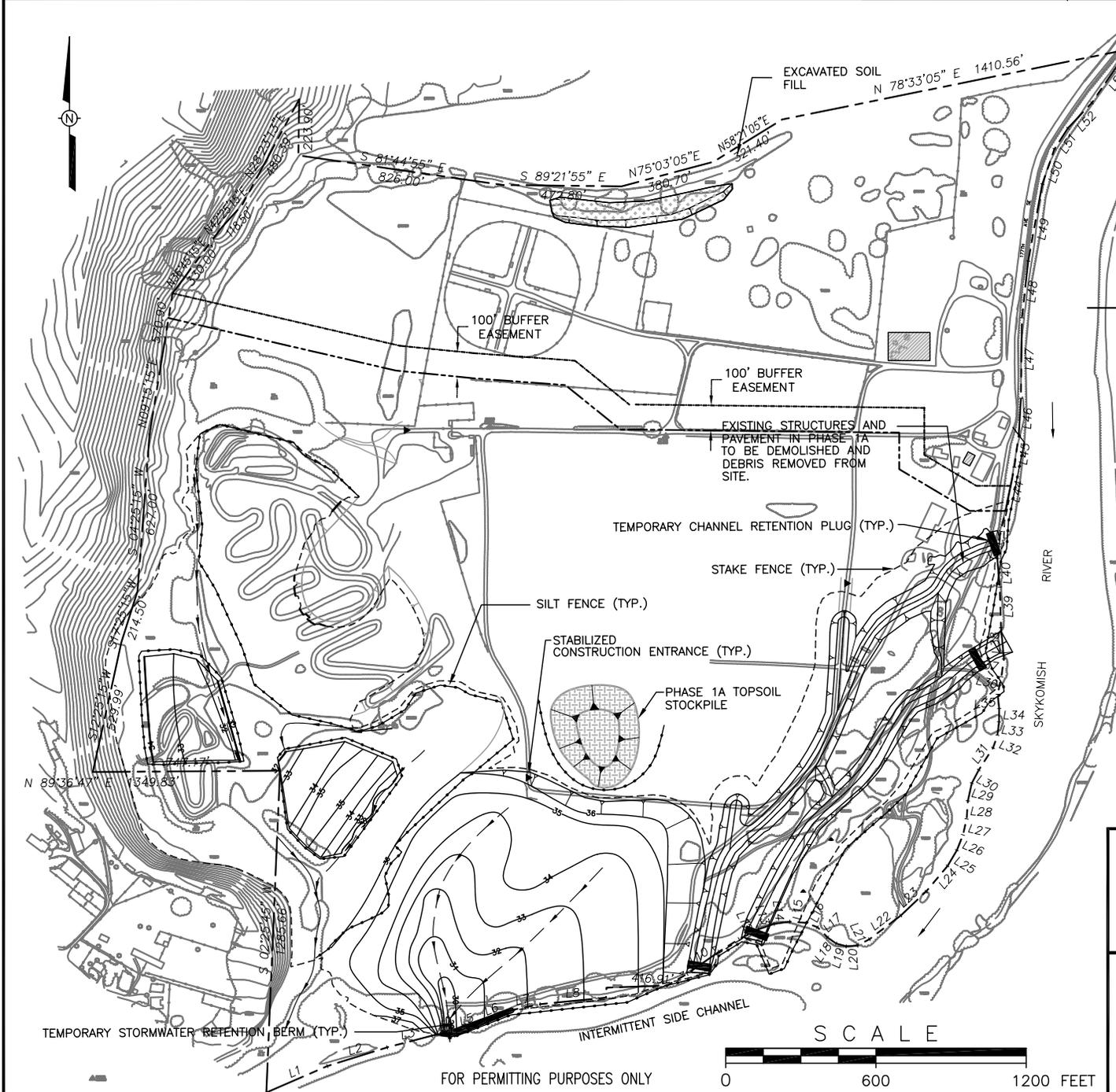
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Fax. (425) 486-9766

**FIGURE 10**  
**CHANNEL HYDRAULICS DETAILS**  
**OUTLETS**  
SKYKOMISH HABITAT LLC  
SKYKOMISH HABITAT MITIGATION BANK - PHASE I  
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			3/21/06	BOTHELL

114731.04



**LEGEND:**

- Limit of Construction and Stake Fence
- Silt Fence
- █ Temporary Channel Retention Plug
- ▨ Temporary Topsoil Stockpile (See Note 11)
- ▩ Soil Stockpile
- ▨ Equipment Staging Area
- Flowline and Direction
- ▶ Stabilized Construction Entrance
- ▽ Cut Slope
- ▽ Fill Slope
- L50 Surveyed Property Line

Note: See Stormwater and Erosion Control Plan for Temporary Control Structure Details

- Construction Sequence:**
1. Stake out and fence project limits (Stake Fence)
  2. Install Temporary Stormwater and Erosion Controls (Silt Fences, Detention Berms)
  3. Construct Staging Areas and Stockpile Areas
  4. Stripping and Stockpiling of Topsoil
  5. Excavation and Grading (Shown as Bold Contours and Cut Slopes)
  6. Placement of soil in planting areas.
  7. Planting and Soil Stabilization (trees, shrubs, hydroseeding)
  8. Connection of Constructed Wetlands and Channels to River and/or existing channels and wetlands
  9. Removal of Temporary Stormwater and Erosion Controls
  10. Temporary Topsoil Stockpile will remain in place until utilized to provide topsoil layer over final wetland grades.
  11. All Temporary Topsoil Stockpiles will be removed prior to 1A completion.
  12. Temporary channel retention plugs will remain in place until all elements of channel development have stabilized according to the TESC, Planting Schedule, and monitoring results.
- Note: All work within the ordinary high water mark will be completed between July 1 and August 31



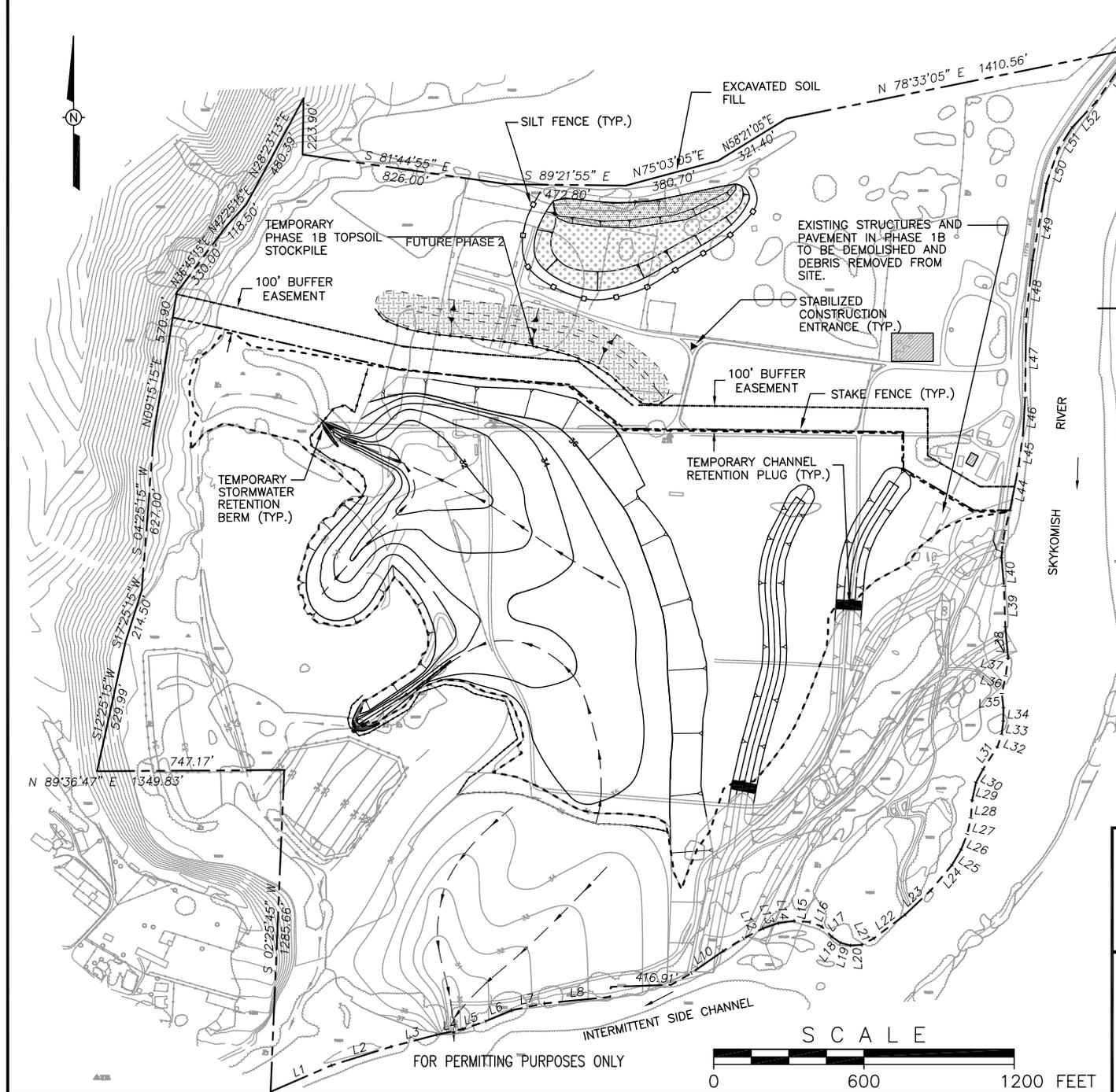
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**FIGURE 11**  
**PHASE 1A CONSTRUCTION SEQUENCE PLAN**  
SKYKOMISH HABITAT LLC  
SKYKOMISH HABITAT MITIGATION BANK--PHASE I  
MONROE, WASHINGTON



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- LEGEND:**
- Limit of Construction and Stake Fence
  - Silt Fence
  - Temporary Channel Retention Plug
  - ▨ Temporary Topsoil Stockpile (See Note 11)
  - ▩ Soil Stockpile
  - ▧ Equipment Staging Area
  - Flowline and Direction
  - ▶ Stabilized Construction Entrance
  - Y Cut Slope
  - Y Fill Slope
  - L50 Surveyed Property Line

Note: See Stormwater and Erosion Control Plan for Temporary Control Structure Details

- Construction Sequence :**
1. Stake out and fence project limits (Stake Fence)
  2. Install Temporary Stormwater and Erosion Controls (Silt Fences, Detention Berms)
  3. Construct Staging Areas and Stockpile Areas
  4. Stripping and Stockpiling of Topsoil
  5. Excavation and Grading (Shown as Bold Contours and Cut Slopes)
  6. Placement of soil in planting areas.
  7. Planting and Soil Stabilization (trees, shrubs, hydroseeding)
  8. Connection of Constructed Wetlands and Channels to River and/or existing channels and wetlands
  9. Removal of Temporary Stormwater and Erosion Controls
  10. Temporary Topsoil Stockpile will remain in place until utilized to provide topsoil layer over final wetland grades.
  11. All Temporary Topsoil Stockpiles will be removed prior to 1B completion.
  12. Temporary channel retention plugs will remain in place until all elements of channel development have stabilized according to the TESC, Planting Schedule, and monitoring results.
- Note: All work within the ordinary high water mark will be completed between July 1 and August 31



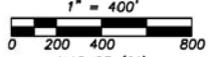
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**FIGURE 12  
PHASE 1B CONSTRUCTION SEQUENCE PLAN**

ACADEMY HOLDINGS  
SKYKOMISH HABITAT MITIGATION BANK—PHASE I  
MONROE, WASHINGTON

# SKYKOMISH HABITAT, LLC

TOWNSHIP 27 NORTH, RANGE 6 EAST, W.M.  
SOUTH HALF SECTION 11  
NORTH HALF SECTION 14



NAD 83 (91)  
WASHINGTON STATE PLANE  
COORDINATE SYSTEM - NORTH ZONE  
AVERAGE COMBINED GRID FACTOR = 0.999952358

### SURVEY NOTES:

- 1) THE CALCULATIONS AND COURSES SHOWN ON THIS SURVEY MEET OR EXCEED THOSE STANDARDS CONTAINED IN WAC 332-130-090.
- 2) NO PROPERTY CORNERS WERE SET NOR ANY FIELD WORK CONDUCTED FOR THIS SURVEY.
- 3) DISTANCES ARE IN FEET AND DECIMALS THEREOF AND REPRESENT CALCULATED OR MEASURED GROUND DISTANCES.
- 4) COORDINATES SHOWN HEREON ARE WASHINGTON STATE PLANE COORDINATES, NORTH ZONE, BASED ON SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS SURVEY CONTROL DATABASE. AVERAGE COMBINED GRID FACTOR = 0.999952358.
- 5) ALL CONTROLLING MONUMENTS SHOWN ARE OF RECORD AND ARE LOCALLY ACCEPTED AS REPRESENTATIVE OF THEIR PURPORTED POSITIONS.
- 6) THIS SURVEY DOES NOT PURPORT TO SHOW ALL EASEMENTS.
- 7) RIVER, ROADS, BUILDINGS AND FENCES ARE FROM PHOTOGRAMMETRY PERFORMED JULY 9, 2002 BY WALKER & ASSOCIATES.
- 8) THE ORDINARY HIGH WATER MARK (OHWM) WAS DELINEATED IN THE FIELD WITH THE ASSISTANCE OF AERIAL PHOTO INTERPRETATION ON JUNE 25, 2004 BY A CERTIFIED PROFESSIONAL WETLAND SCIENTIST (PENTEC) WITH THE OVERSIGHT OF DISTRICT AND REGIONAL REPRESENTATIVES OF THE U.S. ARMY CORPS OF ENGINEERS. THE OHWM WAS IDENTIFIED BASED ON THE EXTENT OF TERRESTRIAL VEGETATION REPRESENTED BY STANDS OF ALDER ALONG THE MARGIN OF THE GRAVEL RIVER CHANNEL. THIS LOCATION WAS PROVIDED TO HARMSEN & ASSOCIATES, INC. BY SHAW ENVIRONMENTAL, INC. IN DIGITAL FORMAT.
- 9) THE ORDINARY HIGH WATER LINE (OHWL) HAS BEEN ANNOTATED FOR THE PURPOSE OF MATHEMATICALLY DEFINING ITS PRESENT LOCATION AS DESCRIBED IN PARAGRAPH 8 ABOVE. THE ACTUAL OHWL LINE MAY VARY DUE TO THE SUBJECTIVE APPLICATION OF CRITERIA USED TO DETERMINE THE LOCATION AND ALSO DUE TO THE NATURAL SHIFTING OF THE RIVER OVER TIME.

NUMBER	BEARING	DISTANCE
L1	N 66°31'00" E	265.73'
L2	N 72°39'41" E	249.73'
L3	N 75°20'36" E	185.30'
L4	N 77°45'22" E	109.58'
L5	N 70°47'17" E	94.87'
L6	N 67°11'42" E	113.33'
L7	N 78°17'18" E	133.94'
L8	N 84°18'28" E	264.22'
L9	N 59°50'47" E	92.82'
L10	N 55°04'53" E	155.64'
L11	N 58°18'26" E	94.10'
L12	N 63°12'34" E	98.22'
L13	N 71°00'28" E	64.11'
L14	N 81°28'24" E	63.28'
L15	S 85°44'29" E	65.17'
L16	S 68°56'43" E	48.63'
L17	S 45°00'00" E	57.41'
L18	S 54°05'33" E	42.48'
L19	S 75°47'40" E	41.41'
L20	N 86°55'18" E	45.11'
L21	N 62°04'12" E	53.95'
L22	N 52°55'54" E	156.94'
L23	N 46°29'22" E	139.99'
L24	N 39°55'54" E	133.24'
L25	N 30°43'03" E	72.35'
L26	N 27°00'34" E	66.10'
L27	N 12°42'26" E	65.19'
L28	N 04°06'20" E	72.39'
L29	N 12°22'16" E	72.00'
L30	N 27°46'59" E	60.16'
L31	N 32°53'08" E	105.04'
L32	N 19°06'39" E	53.76'
L33	N 07°04'12" E	53.13'
L34	N 00°18'13" E	53.39'
L35	N 08°00'52" W	53.17'
L36	N 11°53'35" E	71.65'
L37	N 08°17'26" E	71.44'
L38	N 05°17'37" W	125.71'
L39	N 01°48'10" W	162.46'
L40	N 05°04'19" W	114.05'
L41	N 04°22'51" E	59.70'
L42	N 11°08'09" E	50.49'
L43	N 13°27'15" E	83.12'
L44	N 11°19'01" E	178.23'
L45	N 07°38'39" E	133.45'
L46	N 03°17'33" E	143.94'
L47	N 00°43'02" E	320.18'
L48	N 06°17'17" E	228.39'
L49	N 10°23'46" E	311.55'
L50	N 19°06'18" E	148.38'
L51	N 32°49'47" E	99.38'
L52	N 43°14'15" E	138.94'
L53	N 34°22'10" E	258.59'

### SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY RECORDING ACT AT THE REQUEST OF ACADEMY HOLDINGS, LLC IN DECEMBER, 2004.



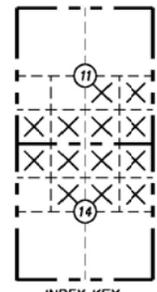
SCIPIO M. WALTON, PLS  
PROFESSIONAL LAND SURVEYOR  
REGISTRATION NO. 3375

### AUDITOR'S CERTIFICATE

FILED FOR RECORD THIS \_\_\_\_\_ DAY OF \_\_\_\_\_ 2005.  
AT \_\_\_\_\_ M. IN BOOK \_\_\_\_\_ OF SURVEYS AT PAGE \_\_\_\_\_  
AT THE REQUEST OF HARMSEN & ASSOCIATES, INC.

BOB TERWILLIGER BY \_\_\_\_\_  
COUNTY AUDITOR DEPUTY COUNTY AUDITOR

AF#



T.27N, R.5E., W.M.

**SKYKOMISH HABITAT, LLC**  
**LARGE TRACT SEGREGATION AND D.N.R. EASEMENT SURVEY**

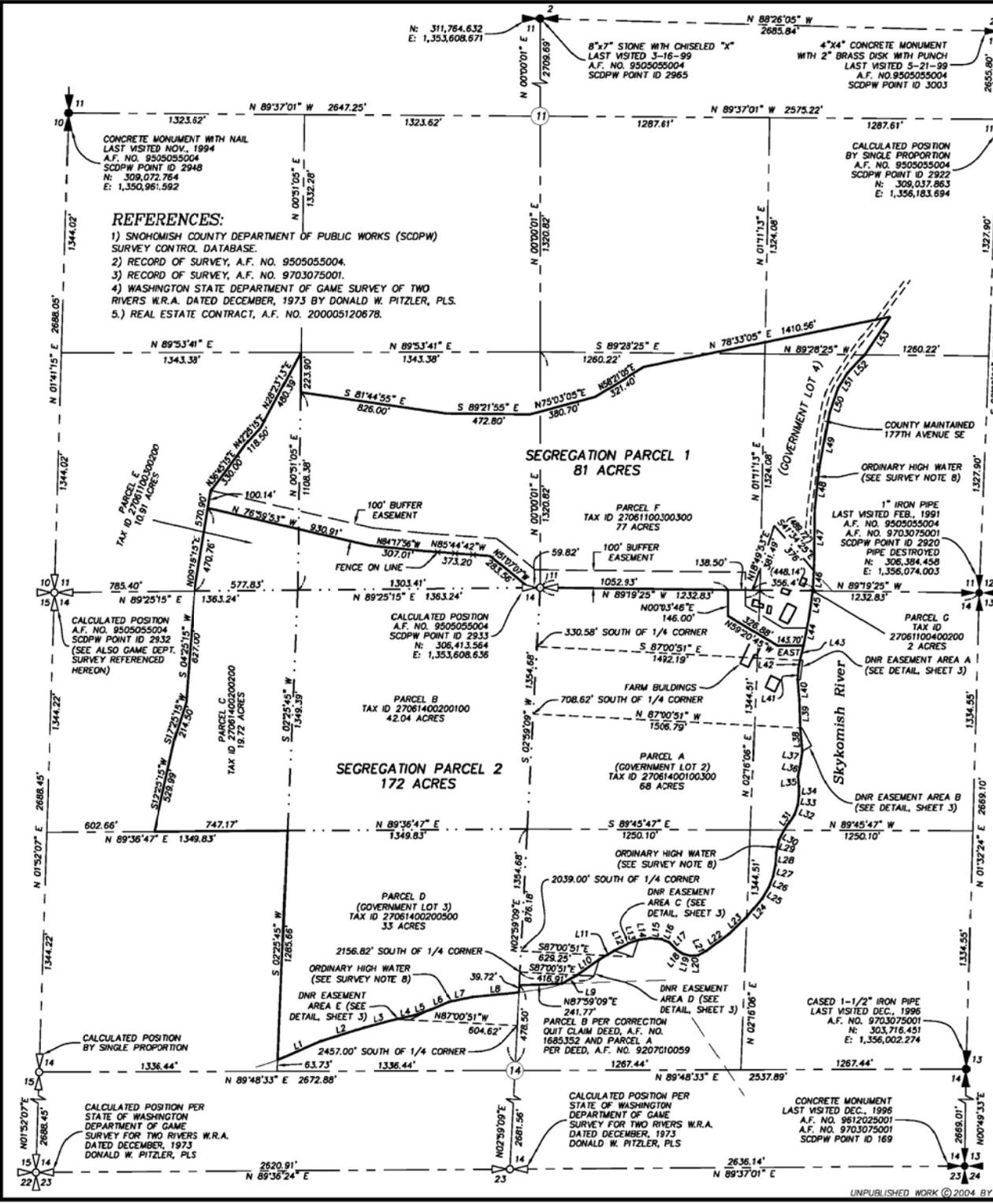
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5-16-05

REVISIONS:  
F/B: -  
JMB: 04-278

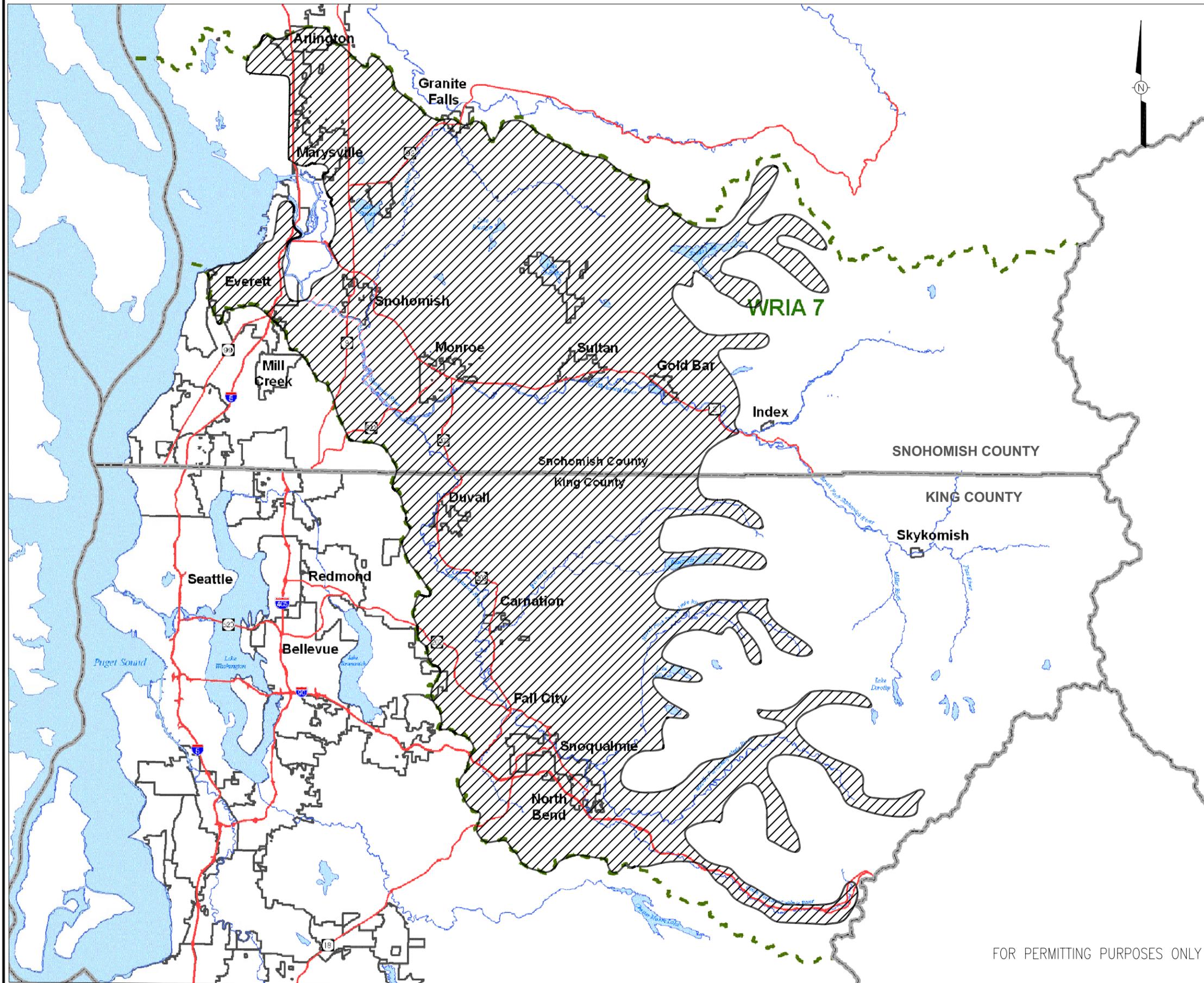
HARMSEN & ASSOC. INC  
17614 WEST MAIN STREET  
POST OFFICE BOX 516  
WONROE, WA. 98272  
PH: (360)794-7811 / (206)343-5903

SHEET 1 OF 3  
DWG: L.TS.DWG  
S.T.R. INDEX  
T.27N, R.5E.  
S. 1/2, SEC. 11  
N. 1/2, SEC. 14

FIGURE 13  
SITE SURVEY



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			3/21/06	3/21/06
			BOTHELL	114731.04



**LOCATION MAP**  
NOT TO SCALE

**LEGEND:**

- PROPOSED SERVICE AREA
- COUNTY BORDER
- WRIA 7 BORDER
- HIGHWAYS AND INTERSTATES
- CITY JURISDICTION
- 2,500' CONTOUR LIMIT

Notes:  
1. Snohomish County base map was obtained from King County, GIS Services, 03/08/2006.



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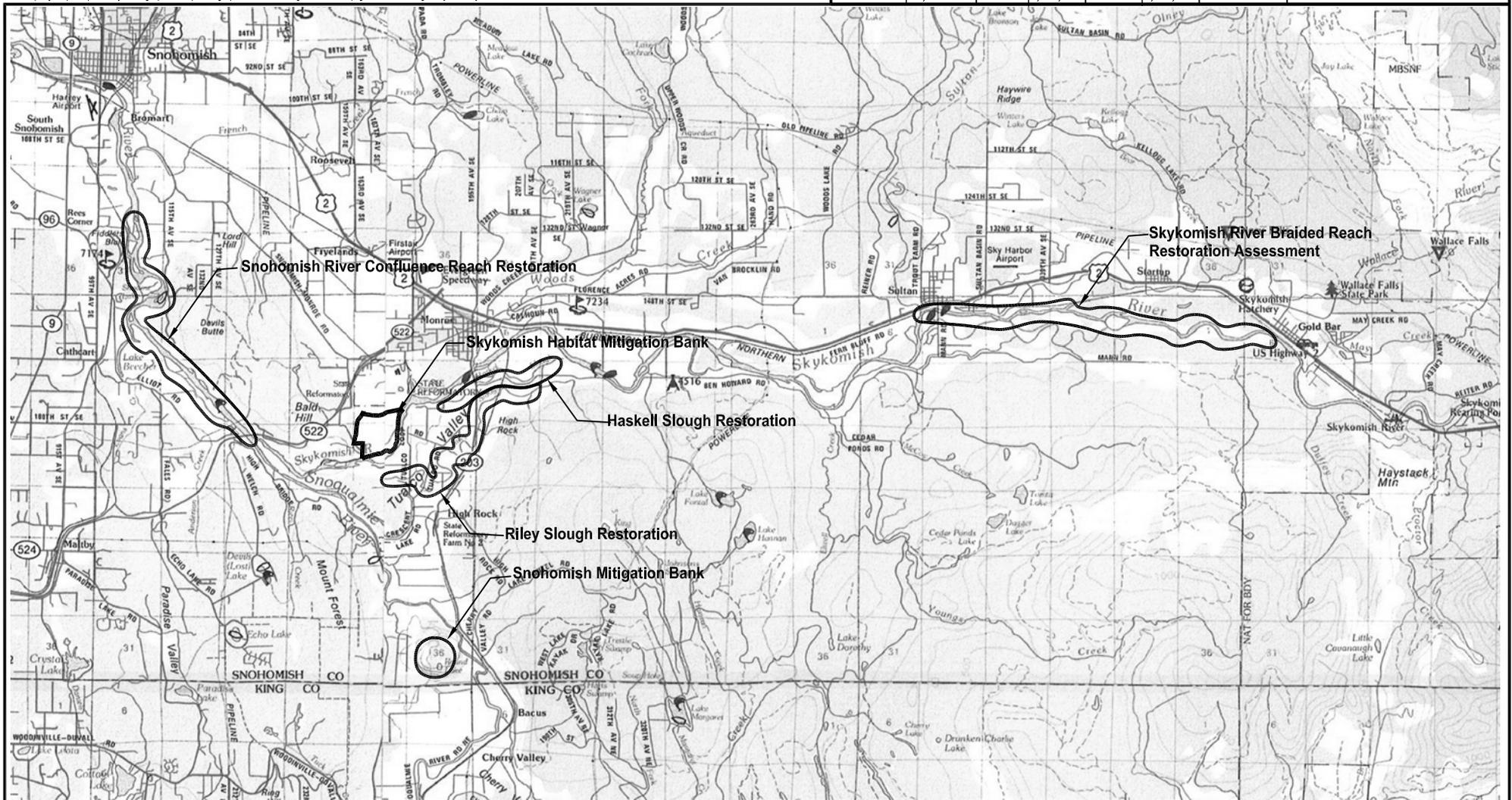
**FIGURE 14**  
**SERVICE AREA MAP**  
SKYKOMISH HABITAT LLC  
SKYKOMISH HABITAT MITIGATION BANK-PHASE 1  
MONROE, WASHINGTON

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XREF Files: IMAGE Files: 20060118105027\_00001.jpg Project Vicinity Map\_00001.jpg  
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SO	3/2006	DSC 3/21/06	KWW 3/21/06	BOTHELL

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NOTE: This map is not a comprehensive illustration of all restoration projects located in the vicinity of the Skykomish Habitat Mitigation Bank.



**Shaw**  
Shaw Environmental, Inc.

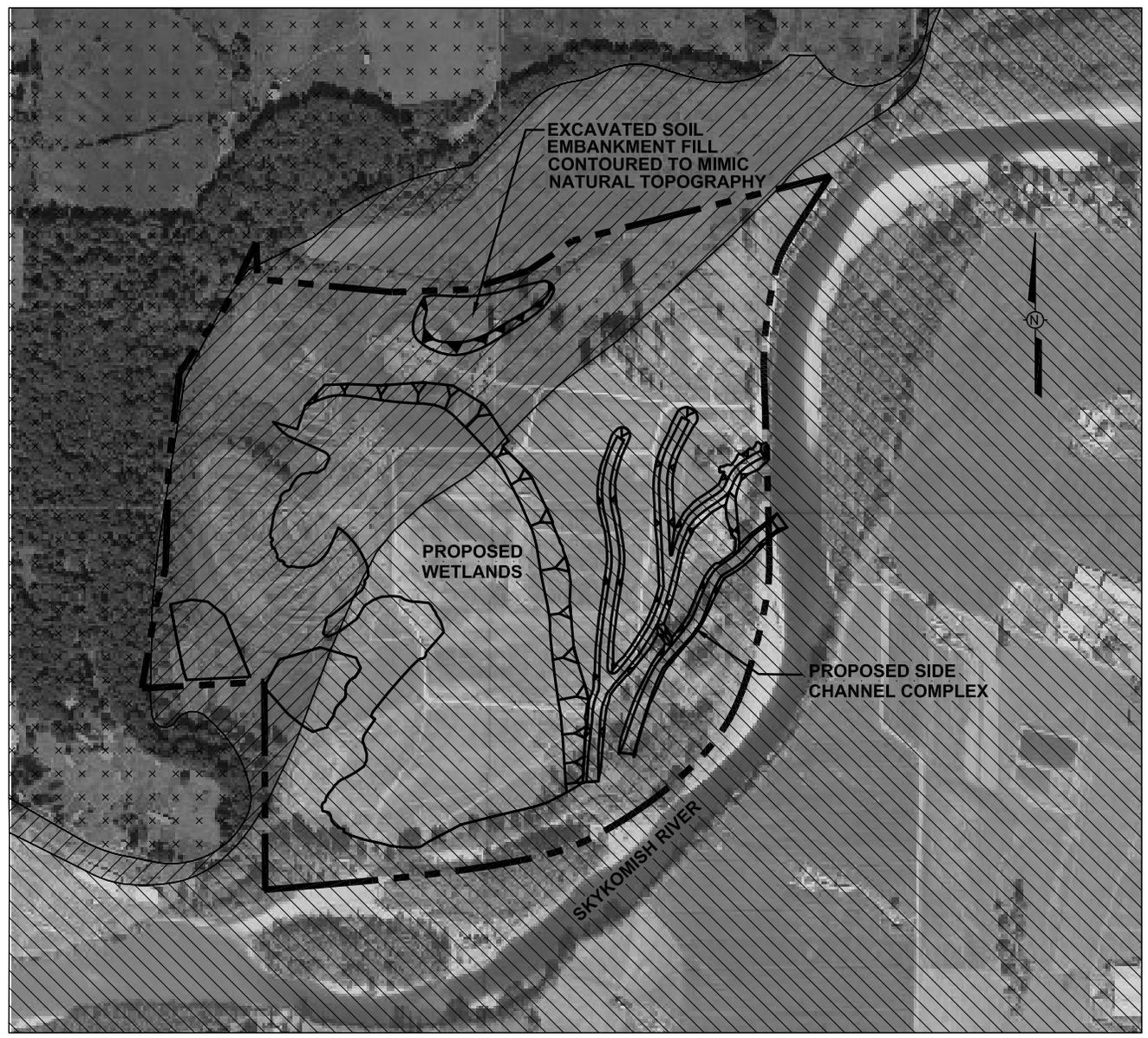
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Bothell, Washington 98011  
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Fax. (425) 486-9766

**FIGURE 15**  
**WATERSHED RESTORATION PROJECTS VICINITY MAP**  
SKYKOMISH HABITAT LLC  
SKYKOMISH HABITAT MITIGATION BANK - PHASE I  
MONROE, WASHINGTON

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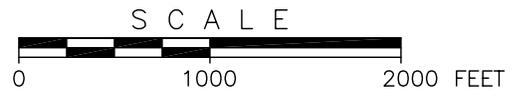
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 CHECKED BY: DSC 3/21/06  
 APPROVED BY: KWW 3/21/06  
 OFFICE: BOTHELL  
 DRAWING NUMBER: 108847

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 File: N:\Project\final\Academyholdings\114731\Drawings\MBI Final Drawings-3-21-06\FIGURE-16.dwg Layout: Model User: shone.oden Mar 27, 2006 - 10:11am



**NOTES:**

1. FLOODWAY AND FLOOD HAZARD BOUNDARIES ARE FROM FLOOD INSURANCE RATE MAP (FIRM), SNOHOMISH COUNTY WASHINGTON AND INCORPORATED AREAS PANELS 1360 AND 1380 OF 1575 DATED NOVEMBER 8, 1999, PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY NATIONAL FLOOD INSURANCE PROGRAM.
2. NO FILL ABOVE EXISTING GRADE ELEVATIONS IS PROPOSED IN THE FLOODWAY.



**LEGEND:**

-  FLOODWAY
-  FLOOD HAZARD AREA
-  AREA OUTSIDE 500-YEAR FLOOD BOUNDARY
-  PROPOSED FILL
-  PROPOSED CUT
-  PROPERTY LINE



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**FIGURE 16  
 FLOODWAY MAP**

SKYKOMISH HABITAT LLC  
 SKYKOMISH HABITAT MITIGATION BANK - PHASE 1  
 MONROE, WASHINGTON

## Appendix 1: Skykomish Habitat Mitigation Banking Instrument

### PERMITS AND AUTHORIZATIONS REQUIRED FOR THE SHMB

<b><u>Permit or Authorization</u></b>	<b><u>Issuing Agency</u></b>	<b><u>File Number</u></b>
404 Permit – NWP 27	Corps	200300879
- Section 7 Concurrence	NOAA Fisheries/USFWS	200300879
CZM Certification of Consistency	Corps / Ecology	200300879
401 Water Quality Certification	WA Dept. of Ecology	200300879
Hydraulic Project Approval	WA Dept. of Fish & Wildlife	WRIA 07.0012 / WDFW Log No. ST-100039-01
Aquatic Use Authorization (right of entry)	WA Dept. of Natural Resources	23-078532
Shoreline Substantial Development	Snohomish County / Ecology	2005-NW-300048
Shoreline Conditional Use	Snohomish County / Ecology	WAR-007140
Stormwater General Permit	Ecology	04 114730
SEPA Review / Compliance	Snohomish County	04 114730
County Conditional Use Permit – Excavation and Processing of Minerals	Snohomish County	04 114730 - HE
Flood Hazard Permit	Snohomish County	04 114730 -FZ
Haul Route Agreement	Snohomish County	2706-B4-151-05
Cultural Resources Review	Snohomish County / SHPO/ Tulalip Tribes	04 114730

## Appendix 1: Skykomish Habitat Mitigation Banking Instrument

### TECHNICAL REFERENCES

In addition to the Legal Authorities cited in Section 2, the following references were used to develop the Skykomish Habitat Mitigation Bank and this MBI.

1. . Skykomish Habitat, LLC and Shaw Environmental, “Site Characterization and Conceptual Design: Proposed Salmonid Habitat Mitigation Bank for the Puget Sound ESU Area,” March 18, 2003
2. . Skykomish Habitat, LLC and Pentec Environmental, “Prospectus - Skykomish Habitat Mitigation Bank: Monroe, Snohomish County, Washington,” April 1,5 2005
3. . Skykomish Habitat, LLC and Pentec Environmental “Biological Evaluation – Skykomish Habitat Mitigation Bank: Monroe, Snohomish County, Washington,” November 19, 2004 (and March 28, 2005 supplement)
4. . Skykomish Habitat, LLC and Shaw Environmental, Memorandum (Piper M. Rolan): “Response to Bank review team comment re: potential for persistent agricultural chemicals in topsoils,” April 7, 2005
5. . Skykomish Habitat, LLC and Shaw Environmental, “Basis of Design Report - Skykomish Habitat Mitigation Bank: Monroe, Snohomish County, Washington,” September 2, 2004 (and Appendices listed below)
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## Appendix 1: Skykomish Habitat Mitigation Banking Instrument

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