

Snohomish Riverfront Properties at Bigelow Creek: Conceptual Enhancement Program

Prepared by:

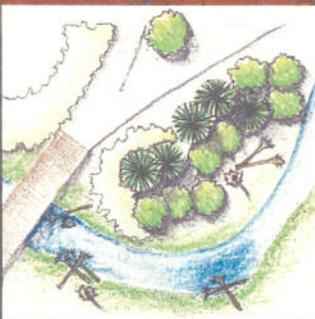
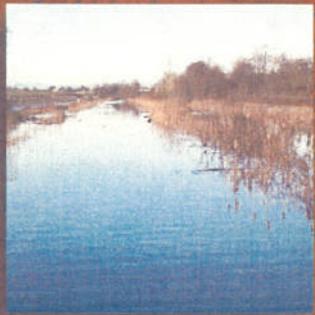


The Watershed Company

Prepared for:

**City of Everett
Engineering/Public Services Director
3200 Cedar Street
Everett, WA 98201**

July 2005



SNOHOMISH RIVERFRONT PROPERTIES AT BIGELOW CREEK: CONCEPTUAL ENHANCEMENT PROGRAM

Prepared for:



City of Everett
Department of Engineering and Public Services
3200 Cedar Street
Everett, Washington 98201

Prepared by:



The Watershed Company

1410 Market Street Kirkland, WA 98033
(425) 822-5242 ~ Fax(425) 827-8136
watershed@watershedco.com ~ www.watershedco.com

Oversight Committee and Citizens Advisory Board:

Dave Davis, Everett Dept. of Engineering & Public Services

Daryl Williams, Tulalip Tribes

Sue Adams, Pilchuck Audubon Society

Sean Edwards, Everett Neighborhoods

Andy Hall, City at Large

David Mascarenas, Public Employees for
Environmental Responsibility

Louise Stanton-Matsen, Everett Chamber of Commerce

July 2005



Introduction

Opportunity: *To restore more natural and productive riverine, estuarine, and wetland habitats to benefit fish and wildlife, and provide an educational and passive recreational amenity for the public.*

The Watershed Company was retained by the City of Everett (City) to prepare a *Conceptual Enhancement Program* (Program) for parcels referred to as the “Riverfront Properties.” The Watershed Company was guided in this work by the City of Everett, the Tulalip Tribes, and a Citizens Advisory Board that included representatives of the Pilchuck Audubon Society, the Everett neighborhoods, Public Employees for Environmental Responsibility, and the Everett Areas Chamber of Commerce¹.

Background:

This study was prepared to comply with conditions of a 2003 settlement agreement (Tulalip Agreement) between the City of Everett and the Tulalip Tribes of Washington, and a 2004 settlement agreement (Pilchuck Agreement) between the City and the Pilchuck Audubon Society and the Public Employees for Environmental Responsibility. Future plans for the Riverfront Properties are partially guided by these agreements, which are the culmination of legal disputes related to the City’s planned development of the 41st Street overcrossing and the City’s Shoreline Master Program (SMP) adopted in 2002.

The settlement agreements impose some restrictions on the City’s planned redevelopment of the Riverfront Properties. Included are items such as establishment of vegetated buffers, protection of wetlands, and provisions for habitat enhancements. Neither of the settlement agreements poses any specific restrictions on habitat enhancement, but they do provide a framework for habitat enhancement to occur. For example, the Tulalip Agreement includes provisions that the City will complete acquisition of the Burlington Northern Santa Fe (BNSF) railroad tracks that currently cross the Riverfront Properties. Following acquisition, the City will remove these tracks, providing an opportunity for habitat enhancement of the existing track area. The Tulalip Agreement also provides for the City and the Tribes to jointly pursue funds and for the City to contribute specified fund amounts for habitat enhancement implementation if outside funding sources are not secured. Further, the Pilchuck Agreement required that the City create the six-member Citizens Advisory Board to assist with development of the Program.

This study was initiated with a review of existing reports provided by the City. This was followed up with on-site work and consultation with the Citizens Advisory Board. A list of information gaps was compiled and a broad vision for enhancement opportunities was developed. Following completion of these actions, habitat enhancement opportunities were further refined and the conceptual designs presented in this report were developed.

Existing Conditions:

The Riverfront Properties encompass approximately 210 acres of land owned by the City and bounded by Lowell River Road on the south, the Snohomish River on the east, 36th Street on the north, and the BNSF mainline rail corridor on the west. Additional auxiliary railroad tracks and Bigelow Creek cross through the properties. There is an approximately 45-acre fill area referred to as the “Simpson Development Pad”

¹ Oversight Committee and Citizens Advisory Board: Dave Davis, City of Everett Dept. of Engineering and Public Services; Daryl Williams and Kurt Nelson, Tulalip Tribes; Sue Adams, Pilchuck Audubon Society; Sean Edwards, Everett Neighborhoods; Andy Hall, City at Large; Dave Mascarenas, Public Employees for Environmental Responsibility; Louise Stanton-Matsen, Everett Areas Chamber of Commerce.



(or Simpson Pad), an approximately 63-acre previous landfill referred to as Development Pad 2, and large wetland areas that are associated with Bigelow Creek and/or the Snohomish River.

Wetland areas are comprised of 75 wetlands identified in a 1994 wetland delineation study completed by Pentec Environmental, Inc. These wetlands have been divided into four main wetland groupings distinguished by their positions relative to the Simpson Pad. These wetland groupings have been labeled the North Wetland Complex, the East Wetland Complex, the South Wetland Complex, and the West Wetland Complex (see Existing Conditions exhibit, page iv). Additional wetlands are present within ditches that parallel the railroad tracks, located southeast of the landfill and northwest of the Simpson Pad. One of these ditches, referred to as the Middle Ditch, is located in between two sets of tracks and carries stream flow that has been diverted away from nearby Bigelow Creek. A second ditch, located on the west side of the mainline track has been labeled the West Ditch. It is intended that these railroad tracks be abandoned and removed in the near future. If track removal is completed as planned, the remaining railroad ballast will provide opportunities for trail connections, as well as opportunities for establishment or expansion of wetlands, stormwater treatment bioswales, and stream connections with existing wetland areas located within the ditches that parallel the tracks. For the purposes of this conceptual enhancement program, it is assumed that these railroad tracks will be removed.

As mentioned, Bigelow Creek crosses the Riverfront Properties after entering the site via a culvert that outlets on the east side of the BNSF mainline rail corridor. Bigelow Creek is a small, tidally influenced stream that flows northeast through the subject property by way of a series of short open defined channel sections, undefined wetland sheet flow, and culverts. The stream ultimately outlets into the Snohomish River at approximately river mile 5.8. Bigelow Creek receives groundwater and surface water runoff from the Lowell neighborhood to the west of the subject property. Salmonids and other fish species reportedly utilize on-site portions of Bigelow Creek; however, fish habitat is limited in Bigelow Creek due to passage barriers and other limitations within the on-site channel sections.

Historic land uses on the Riverfront Properties have included native harvesting, fishing, farming, and use of portions of the property by the Simpson Mill and as a regional landfill. Past land uses have altered natural landforms on the property through vegetation clearing, grading, water diversion, ditching, road and railroad building, and other infrastructure construction. Previous on-site connections between floodplain wetlands, Bigelow Creek, and the Snohomish River have been cutoff and/or restrained to accommodate past land uses. Monotypic, early-successional native plant communities co-dominate with non-native, invasive plant communities due to ongoing disturbance within on-site wetlands and surrounding uplands.

Program Elements:

Seven “Program Elements”, listed below, have been developed for the Riverfront Properties, each of which targets a particular habitat, educational, or recreational function. The locations of each Program Element are illustrated on the Overall Conceptual Plan exhibit (page v).

- ① North Wetland Complex & Snohomish River Shore
- ② Reconnection of the East & South Wetland Complexes, Former Dewatering Area & the Snohomish River Shore
- ③ Reconnection of the West & North Wetland Complexes via a Revitalized Section of Bigelow Creek
- ④ Relocating & Daylighting Bigelow Creek Channel
- ⑤ North Wetland Complex, Middle Ditch & Bigelow Creek Connections

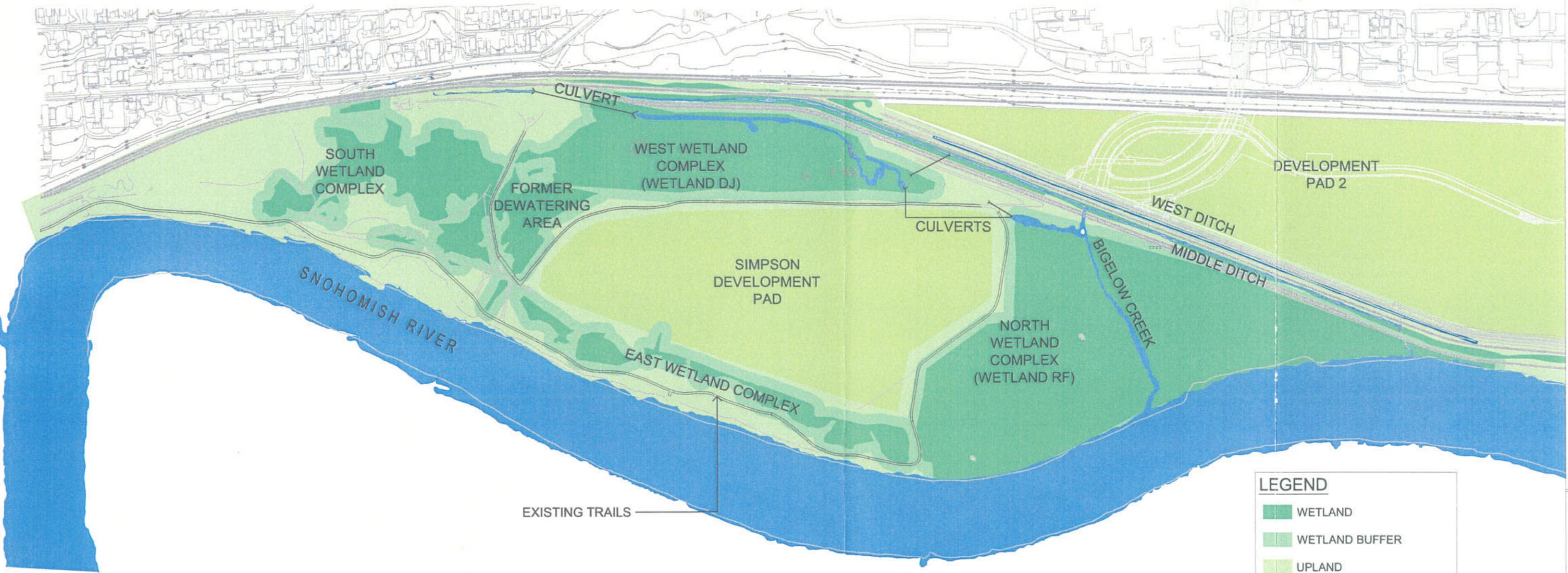
SNOHOMISH RIVERFRONT PROPERTIES AT BIGELOW CREEK CONCEPTUAL ENHANCEMENT PROGRAM



Prepared For THE CITY OF EVERETT

NO.	DATE	REVISION

PROJECT MANAGER: KC
DESIGNED: GJ | DRAFTING: MG
CHECKED: BW | FILE: boe-mc2



LEGEND

- WETLAND
- WETLAND BUFFER
- UPLAND
- DEVELOPMENT AREAS
- RIVER/STREAMS/DITCHES

The Watershed Company
1410 Market Street
Kirkland, WA 98033
425.822.5242 Fax: 425.827.8136
watershed@watershedco.com
www.watershedco.com

CLIENT:
CITY OF EVERETT

ADDRESS:
BIGELOW EVERETT ENHANCEMENT AREA; EVERETT, WA

TITLE:
ENHANCEMENT PROGRAM: EXISTING CONDITIONS

JOB NUMBER: 040712

SHEET NUMBER: iv

ENHANCEMENT PROGRAM: EXISTING CONDITIONS

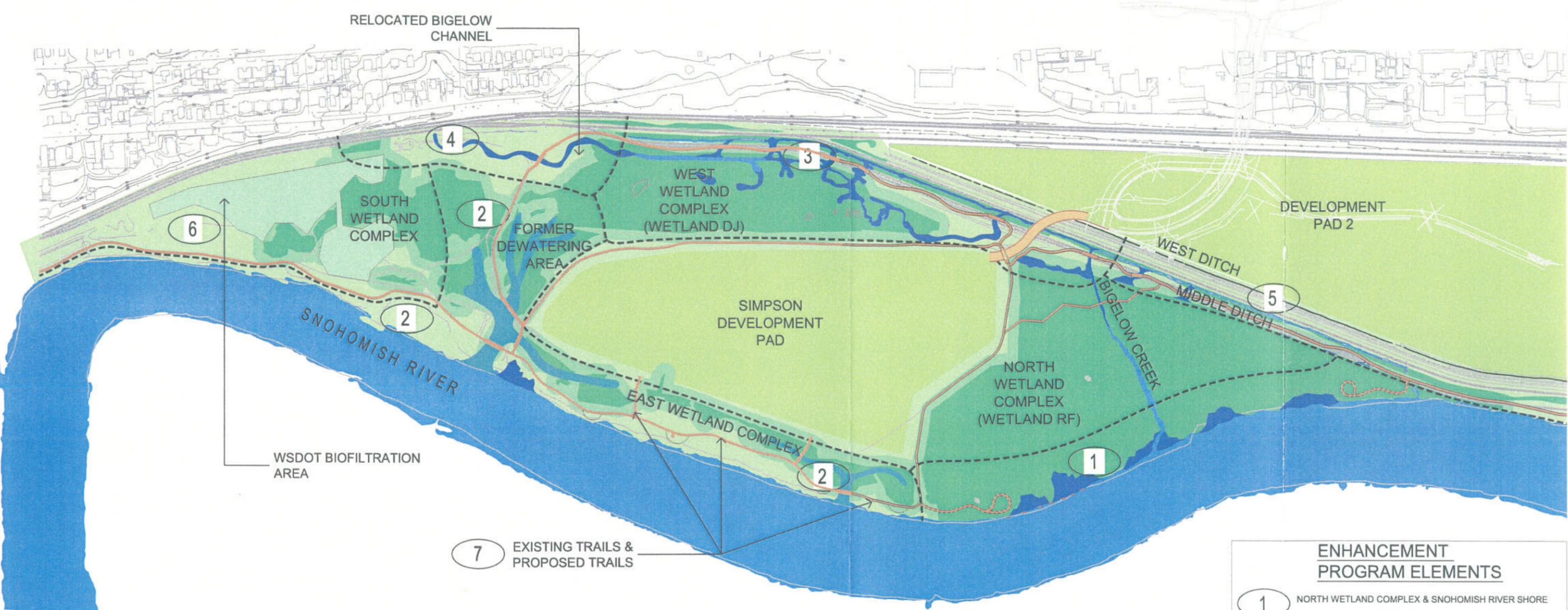
SCALE: 1" = 500'-0"





NO.	DATE	REVISION

PROJECT MANAGER: KC
DESIGNED: GJ | DRAFTING: MG
CHECKED: BW | FILE: 000-002



LEGEND

	WETLAND
	WETLAND BUFFER
	UPLAND
	DEVELOPMENT AREAS
	RIVER/STREAMS/DITCHES

ENHANCEMENT PROGRAM ELEMENTS

1	NORTH WETLAND COMPLEX & SNOHOMISH RIVER SHORE
2	RECONNECTION OF THE EAST & SOUTH WETLAND COMPLEXES, FORMER DEWATERING AREA AND THE SNOHOMISH RIVER SHORE
3	RECONNECTION OF THE WEST & NORTH WETLAND COMPLEXES VIA A REVITALIZED BIGELOW CREEK SECTION
4	RELOCATING & DAYLIGHTING BIGELOW CREEK CHANNEL
5	NORTH WETLAND COMPLEX, MIDDLE DITCH & BIGELOW CREEK CONNECTIONS
6	INTERPRETIVE CENTER
7	TRAIL SYSTEM IMPROVEMENTS

ENHANCEMENT PROGRAM: OVERALL CONCEPTUAL PLAN

SCALE: 1" = 500'-0"



The Watershed Company
1410 Market Street
Kirkland, WA 98033
425.822.5242 Fax: 425.827.8136
watershed@watershedco.com
www.watershedco.com

CLIENT: CITY OF EVERETT

ADDRESS: BIGELOW EVERETT ENHANCEMENT AREA; EVERETT, WA

TITLE: ENHANCEMENT PROGRAM OVERALL CONCEPTUAL PLAN

JOB NUMBER: 040712

SHEET NUMBER: V



Program Element 1: North Wetland Complex & Snohomish River Shore

Opportunity: *To create more natural and productive riverbank edge habitat and expand riverine, estuarine and wetland function in a degraded area by reconnecting floodplain wetland and river functions through removal of an existing earthen berm.*

Existing Conditions: A bermed Snohomish River bank along the City of Everett's Riverfront Properties artificially separates floodplain and upper estuarine wetlands from the river in the area where Program Element 1 is proposed. The North Wetland Complex is a roughly triangular wetland area bounded by the Simpson development pad on the south, by railroad tracks on the west and northwest, and by the Snohomish River on the east and northeast. It is characterized by expanses of cattail and interspersed patches of open water, with clusters of willow, dogwood and cottonwood found throughout. Bigelow Creek passes through the wetland en route to its outlet at the Snohomish River. A berm located on the east and northeast boundary of the North Wetland Complex currently separates this area from the Snohomish River, and reduces riverine edge habitat as well as floodplain and tidal interactions. Banks of approximately 3,000 feet in length are unnaturally steep in profile, lacking in functional diversity, and vegetated with patches of invasive and monotypic plant communities.

Enhancement Rationale: According to the *Draft Snohomish River Basin Salmon Conservation Plan*, at least 90% of the lower Snohomish River needs natural banks in order to achieve chinook and coho salmon recovery in this river system. Natural banks are complex, with a convoluted edge, backwaters, abundant wood, and overhanging vegetation. Juvenile salmon need these quiet edge-water areas for rearing while they adapt gradually to salt-water habitats as they move downstream. Opportunities to create more natural banks and riverine edge habitat adjacent to the North Wetland Complex are plentiful and promise tremendous potential for expansion of wetland, upper estuarine, and riverine ecological function on-site and would benefit the overall habitat function of the larger Snohomish River system. Enhancement efforts in this area can also provide dramatic visual and environmental education benefits.

Proposed Enhancements

Remove the berm between the North Wetland Complex and the Snohomish River to restore floodplain and tidal connections.

- Retain short sections of the berm at both ends to serve as trail viewpoint and interpretive areas.
- Retain and re-sculpt additional short berm sections and/or use limited amounts of the berm materials to form upland hummock islands amidst the wetland to create microhabitat niches, enhancing the diversity of upland and wetland plant and wildlife communities.
- Evaluate existing impediments to fish movement such as weirs, beaver dams, lack of channel connectivity, etc., and modify them as appropriate to increase ecological function.

Improve edge habitat.

- Re-grade and soften the riverbank cross-section, incorporating variable slopes and benches, undulating edges and backwaters.
- Install numerous habitat structures, primarily log complexes, along the river shoreline to restore beneficial and productive edge habitat. Consider placing snags throughout the wetland area.
- Use remnant pilings from previous mill activities to anchor or secure additional wood along the bank.

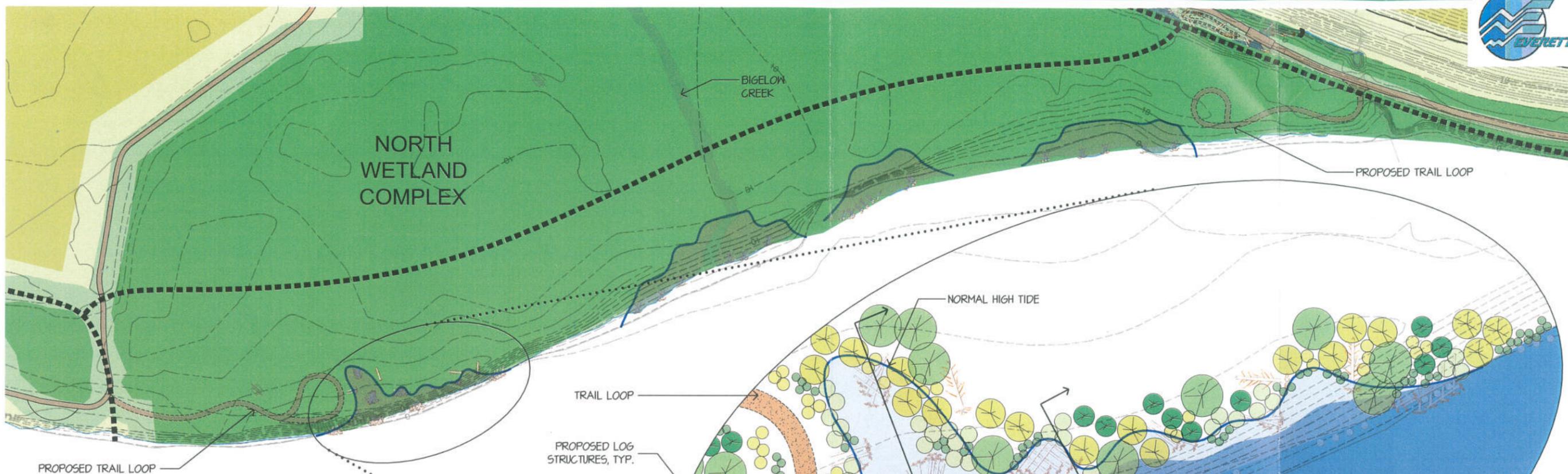
Restore and enhance the vegetation community.

- Replant softened banks with native vegetation: riparian, floodplain, emergent, and scrub-shrub.
- Remove non-native, invasive plant species found in the wetland area and selectively replant native species, increasing the prevalence and diversity of native wetland, riparian, and fringe vegetation.
- Plant conifer trees on upper bank and hummock areas to provide large woody debris recruitment and serve as perches/snags for numerous bird species, including predators such as ospreys and bald eagles.

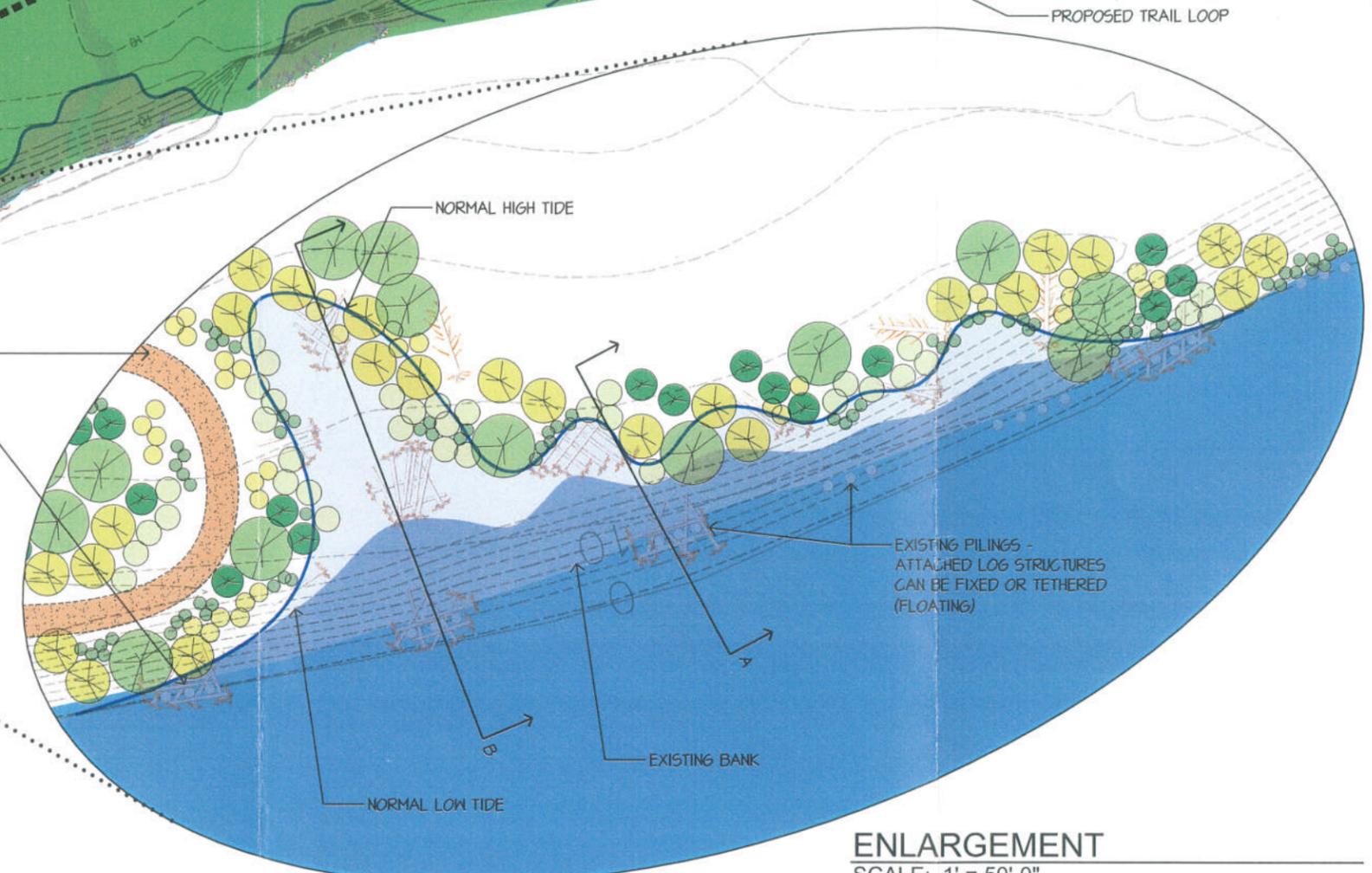


NO.	DATE	REVISION

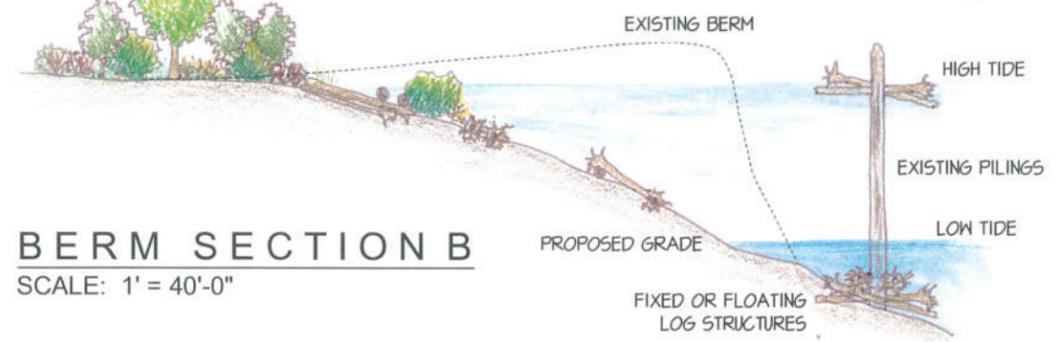
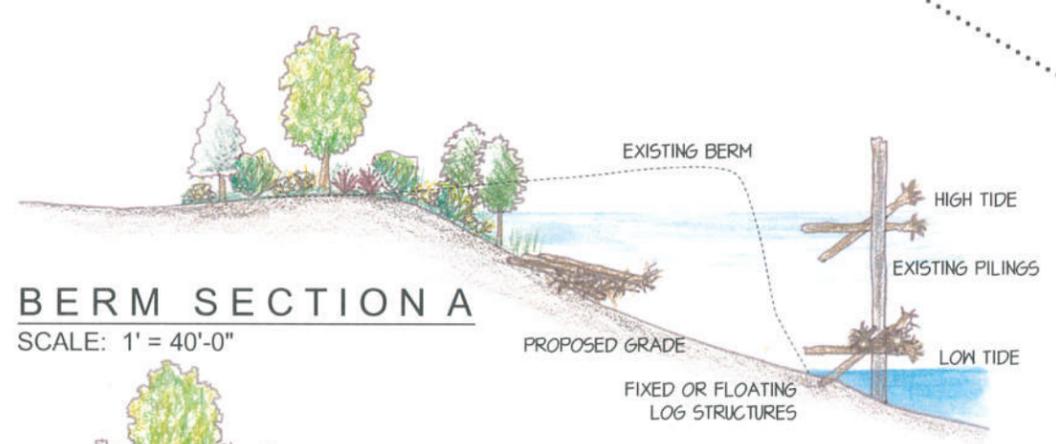
PROJECT MANAGER: KC
DESIGNED: GJ | DRAFTING: MC
CHECKED: BW | FILE: hwy-102



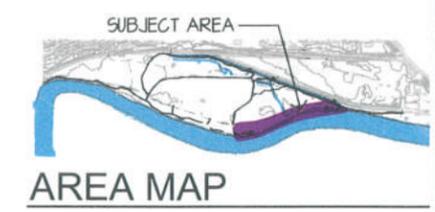
AREA PLAN
SCALE: 1" = 200'-0"



ENLARGEMENT
SCALE: 1" = 50'-0"



- PROPOSED ENHANCEMENTS**
- Remove the berm between the North Wetland Complex and the Snohomish River to restore floodplain and tidal connections
 - Improve edge habitat through creation of backwaters and side channels and through placement of complex log structures
 - Restore and enhance the vegetative community to increase habitat diversity




The Watershed Company
1410 Market Street
Kirkland, WA 98033
425.822.5242 Fax: 425.827.8136
watershed@watershedco.com
www.watershedco.com

CLIENT:
CITY OF EVERETT

ADDRESS:
BIGELOW EVERETT
ENHANCEMENT
AREA; EVERETT, WA

TITLE:
ENHANCEMENT PROGRAM ELEMENT 1 PLAN 1

JOB NUMBER: 040712

SHEET NUMBER: 1-2

PROGRAM ELEMENT 1: NORTH WETLAND COMPLEX & SNOHOMISH RIVERFRONT





Program Element 2: Reconnection of the East & South Wetland Complexes, Former Dewatering Area & the Snohomish River Shore

Opportunity: To create more natural and productive riverbank edge habitat and expand riverine, estuarine, and wetland function in an altered area by creating flood- and tidally-influenced backwater channels with wood and natural vegetation to provide cover for the rearing of juvenile salmonid fish as well as other wildlife benefits.

Existing Conditions: Currently, riverine connections between wetlands labeled as the East and South Wetland Complexes and the Former Dewatering Area are limited by past riverbank modifications, roads and the existing river shore trail. The East Wetland Complex is hydrologically isolated, while hydrological connectivity in the South Wetland Complex and Former Dewatering Area is limited to culverted outlets to the Snohomish River. Vegetation in the East and South Wetland Complexes and the Former Dewatering Area is comprised of some native trees and shrubs with large expanses of invasive, non-native vegetation commonly found in disturbed areas. The Snohomish River adjoining these areas is characterized by approximately 4,500 feet of riverbank that is unnaturally steep in profile and lacking in functional diversity. In general, fish and wildlife opportunities are limited in these areas by monotypic, disturbed habitat conditions. In Program Element 2, connections between wetlands and the Snohomish River will be expanded and enhanced to improve habitat for salmonid fish and other wildlife.

Enhancement Rationale: The Former Dewatering Area and East and South Wetland Complexes provide the best, opportunities for improving and creating new backwater, estuarine channels and embayments on the City of Everett Riverfront Properties. Program Element 2 will increase the amount, and improve the quality, of off-channel estuarine and floodplain rearing habitat for juvenile salmonid fish. The creation of this and similar habitat types is considered to be a crucial aspect of chinook recovery.

Proposed Enhancements

Create backwater channels reconnecting the Former Dewatering Area and portions of the East and South Wetland Complexes to the river.

- Excavate a dendritic network of backwater estuarine channels extending into the Wetland Complexes and Former Dewatering Area to create positive connections with the river and daily tidal fluctuations.
- Construct bridges to retain integrity of the existing trail system.

Improve edge habitat.

- Re-grade and soften the riverbank profile, incorporating undulating edges and backwaters.
- Excavate benches and side channels of varying sizes out of the riverbank. This would facilitate quiet edge water for juvenile chinook and other juvenile salmonid rearing, as well allow placement of log complexes without resulting in a net reduction in the river channel's capacity to pass flows.
- Place generous amounts of wood in varied and complex assemblages throughout the backwater channel network at various depths. Install numerous logs and habitat structures along the river shoreline for restoration of beneficial and productive edge habitat.
- Use remnant pilings from previous mill activities to anchor or secure additional wood along the bank.

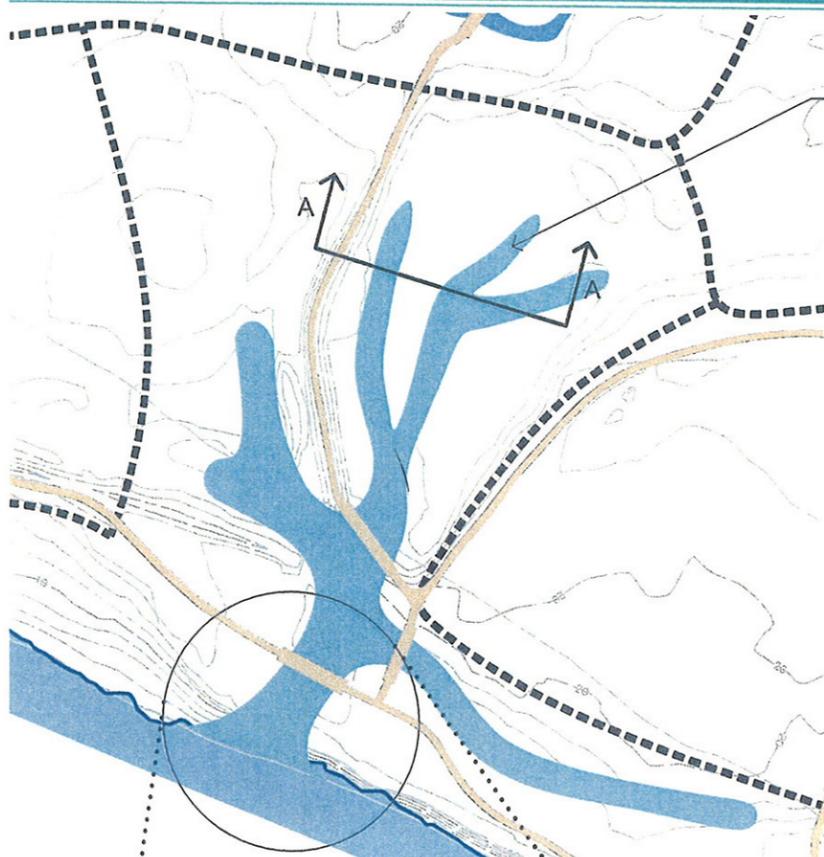
Restore and enhance the vegetation community.

- Revegetate created backwater and adjoining disturbed areas with native vegetation specifically suited, on a microhabitat level, to localized soil moisture conditions, including the regime of tidal and flood fluctuations.
- Remove non-native, invasive plant species found in wetland and estuarine areas, and selectively replant native species, increasing the prevalence and diversity of native wetland, riparian and fringe vegetation

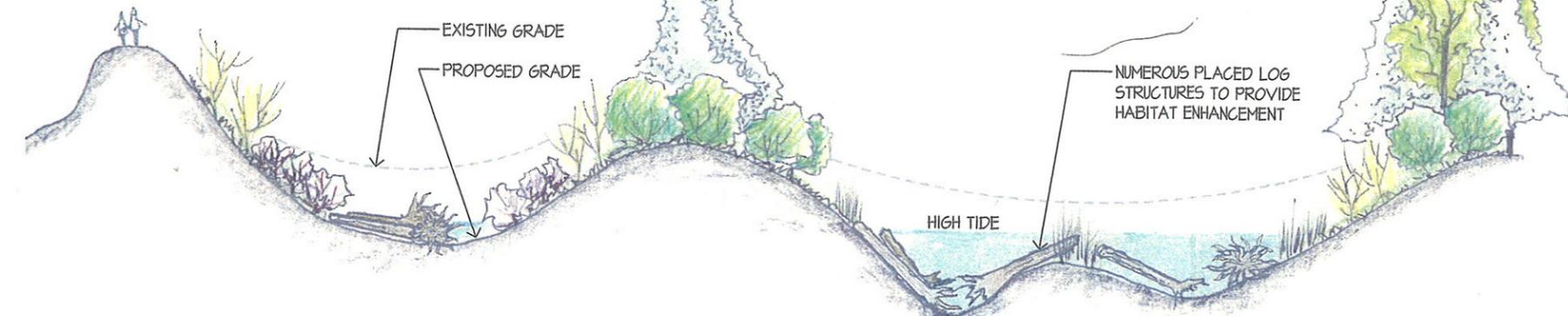


NO.	DATE	REVISION

PROJECT MANAGER: KC
DESIGNED: GJ DRAFTING: MS
CHECKED: BW FILE: lca-vst2



TIDAL BACKWATER CHANNEL NETWORK



EXISTING GRADE
PROPOSED GRADE

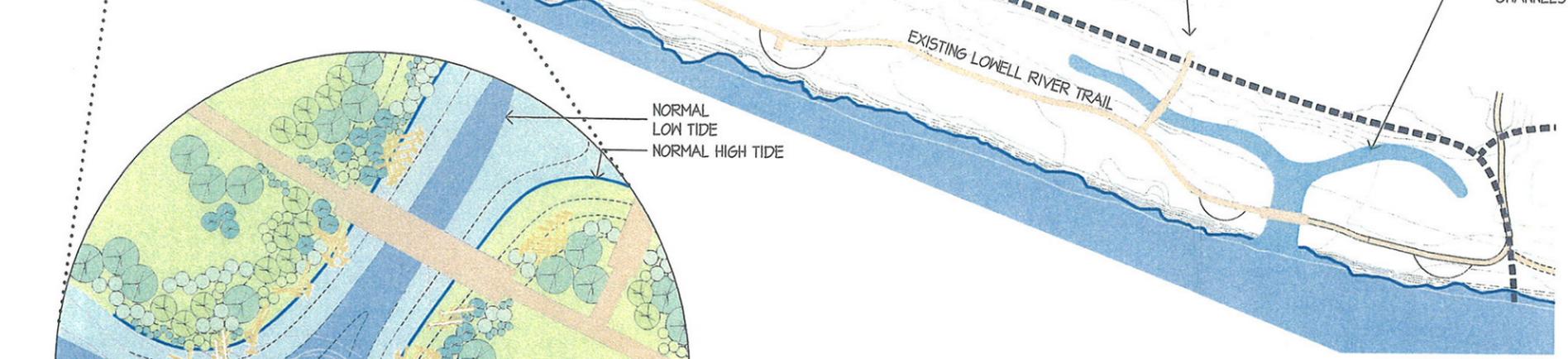
NATIVE TREES AND SHRUBS INCLUDING CONIFERS ON HIGHER GROUND TO PROVIDE SHADE AND LONG TERM WOOD SUPPLY

NUMEROUS PLACED LOG STRUCTURES TO PROVIDE HABITAT ENHANCEMENT

HIGH TIDE

BACKWATER / ESTUARINE CHANNEL SECTION "A"
SCALE: 1" = 40'-0"

AREA PLAN
SCALE: 1" = 250'-0"

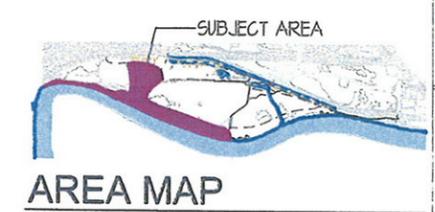


CONNECTIONS TO DEVELOPMENT PAD

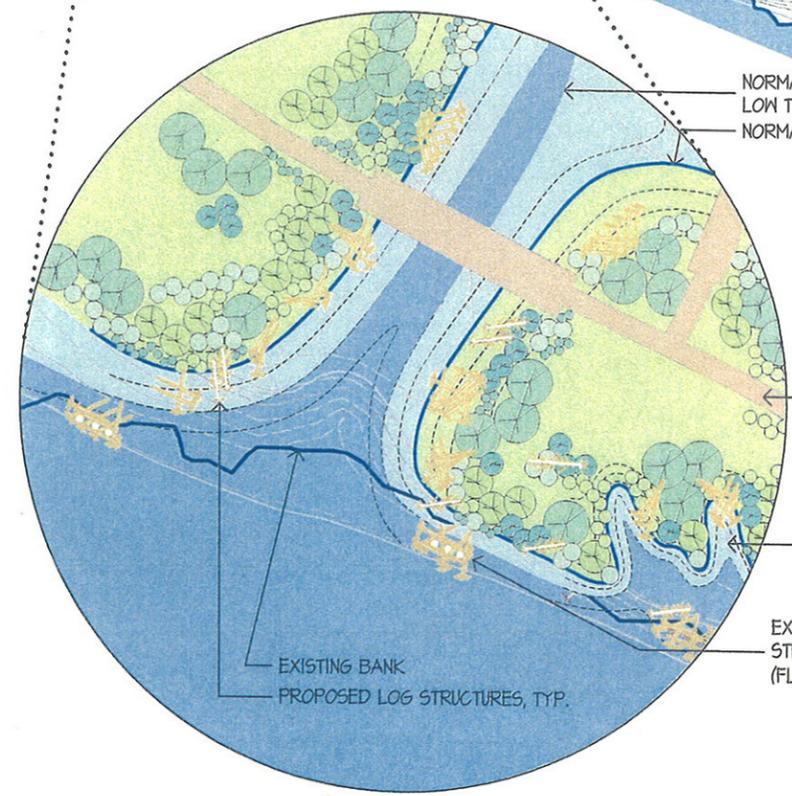
TIDAL BACKWATER CHANNELS

EXISTING LOWELL RIVER TRAIL

NORMAL LOW TIDE
NORMAL HIGH TIDE



AREA MAP



LOWELL RIVER TRAIL

IMPROVED EDGE HABITAT THROUGHOUT (ALSO SEE ELEMENT #1)

EXISTING PILING - ATTACHED LOG STRUCTURES FIXED OR TETHERED (FLOATING)

EXISTING BANK
PROPOSED LOG STRUCTURES, TYP.

PROPOSED ENHANCEMENTS

- Create dendritic network of backwater estuarine channels reconnecting the Former Dewatering Area and portions of the East and South Wetland Complexes to the Snohomish River with daily tidal fluctuations
- Improve edge habitat through modification of the riverbank, incorporating undulating edges, benches, backwaters and side channels
- Restore and enhance the vegetation community to increase habitat diversity
- Place numerous large woody debris complexes to enhance habitat throughout backwater and edge habitat areas

ENLARGEMENT
SCALE: 1" = 80'-0"

PROGRAM ELEMENT 2: RECONNECTION OF THE EAST & SOUTH WETLAND COMPLEXES, FORMER DEWATERING AREA AND THE SNOHOMISH RIVER SHORE



The Watershed Company
1410 Market Street
Kirkland, WA 98033
425.822.5242 Fax: 425.827.8136
watershed@watershedco.com
www.watershedco.com

CLIENT: CITY OF EVERETT

ADDRESS: BIGELOW EVERETT ENHANCEMENT AREA, EVERETT, WA

TITLE: ENHANCEMENT PROGRAM ELEMENT 2

JOB NUMBER: 040712

SHEET NUMBER: 2-2



Program Element 3: Reconnection of the West & North Wetland Complexes via a Revitalized Section of Bigelow Creek

Opportunity: *To increase wetland and stream function through expansion of the West Wetland Complex, restoration of Bigelow Creek flows, hydrologic reconnection of wetlands and streams for unimpeded passage of water, fish, and wildlife between the West and North Wetland Complexes, and the establishment of native vegetation communities.*

Existing Conditions: Railroads and roads constructed decades ago to serve the once regionally important Simpson Mill inadvertently hemmed in the West Wetland Complex and cut it off from its historical connections to Bigelow Creek, a salmonid-fish-bearing stream, and to the North Wetland Complex. The “Middle Ditch,” originally constructed to facilitate railroad use, has captured and diverted some of Bigelow Creek’s essential flow. Remaining Bigelow Creek flows pass through the West Wetland Complex without a distinct channel to provide adequate fish passage. Past land uses within and adjacent to the West Wetland Complex have increased the prevalence of non-native, invasive vegetation, further reducing available habitat diversity. Program Element 3 will revive hydrologic connections, redirecting essential flow back into Bigelow Creek via a relocated and restored channel. Native plant communities will be re-established to provide more diverse food and cover for wildlife.

Enhancement Rationale: According to the *Draft Snohomish River Basin Salmon Conservation Plan*, wetlands provide vital habitat and play an important role in hydrologic and sediment processes at the watershed scale. Therefore, wetland preservation and increases in wetland function and connectivity are critically important. Due to their association with the Snohomish River, the West and North Wetland Complexes have great potential to provide exceptional habitat and hydrologic functions relating to the larger watershed once reconnected to allow free passage of fish, wildlife, and water.

Proposed Enhancements

Expand the West Wetland Complex.

- Remove sections of the abandoned railroad grade, making wetland and open water connections to the Middle Ditch. Grade areas to accommodate native vegetation for habitat improvement.

Increase open water habitat and provide a distinct Bigelow Creek flow pathway for fish passage.

- Excavate variously sized and broadly distributed areas of open water in the West Wetland Complex.
- Provide a fish-passable Bigelow Creek flow pathway through the wetland without compromising wetland hydrology and function.
- Place numerous logs for habitat and cover within the Bigelow Creek channel and surrounding wetland. Install snags throughout the wetland area.

Provide wetland, riparian and channel connectivity between the North and West Wetland Complexes at the Simpson Pad access road crossing.

- Redirect Bigelow Creek flows along the Middle Ditch alignment at the Simpson Pad access road crossing by creating a relocated and enhanced stream channel connection.
- Design and implement the road crossing structure to span associated wetlands and to provide for the unimpeded passage of water, fish, and wildlife between the West and North Wetland Complexes.
- Guide the recombined Bigelow Creek flows into the North Wetland Complex downstream (north) of the access road crossing to the benefit of fish and wildlife habitat.

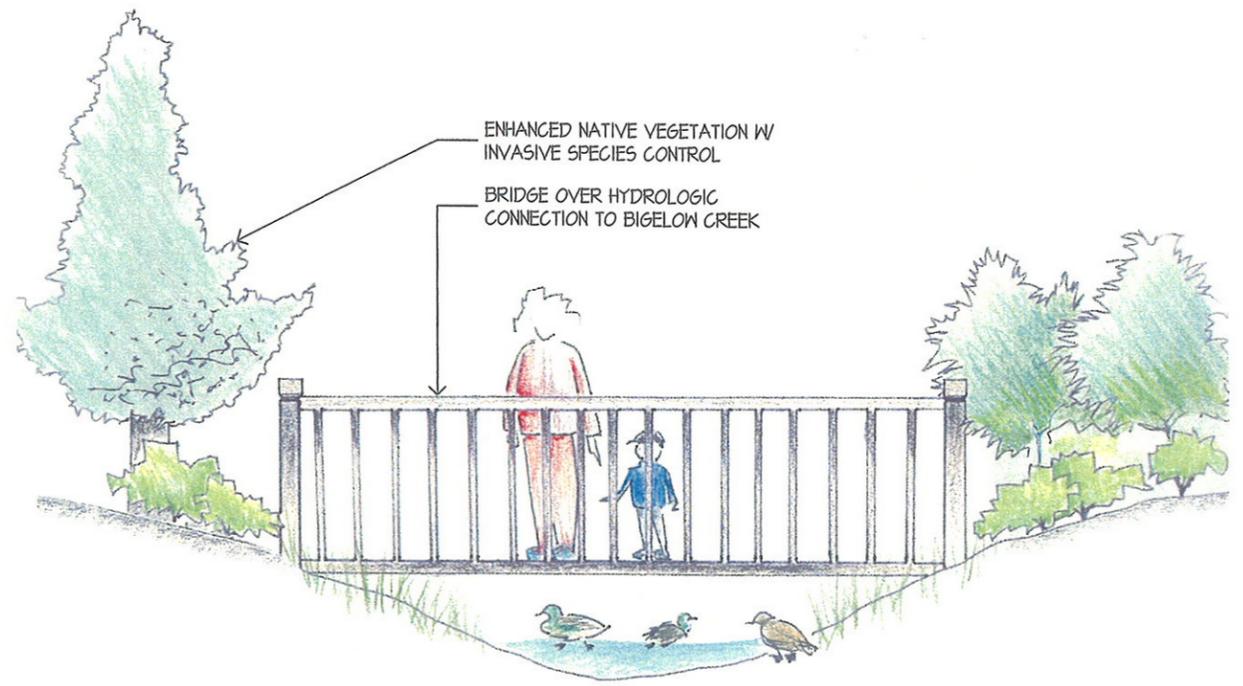
Restore and enhance the vegetation community.

- Remove and control invasive, non-native vegetation and increase the prevalence and diversity of native wetland, riparian, and transitional fringe vegetation.
- Use excavated spoils to create hummocks to support upland and transitional forest vegetation to provide perches/snags for birds, large woody debris recruitment, and to further diversify habitat.

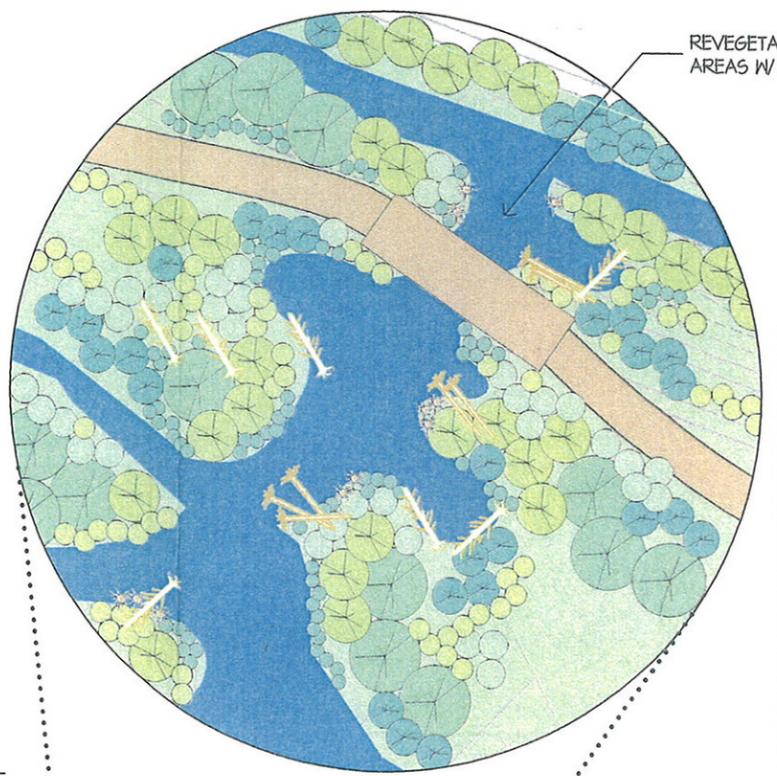


NO.	DATE	REVISION

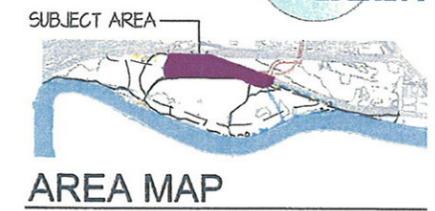
PROJECT MANAGER: KC
DESIGNED: GJ | DRAFTING: MC
CHECKED: BW | FILE: haw-wat



SECTION "A"
NOT TO SCALE

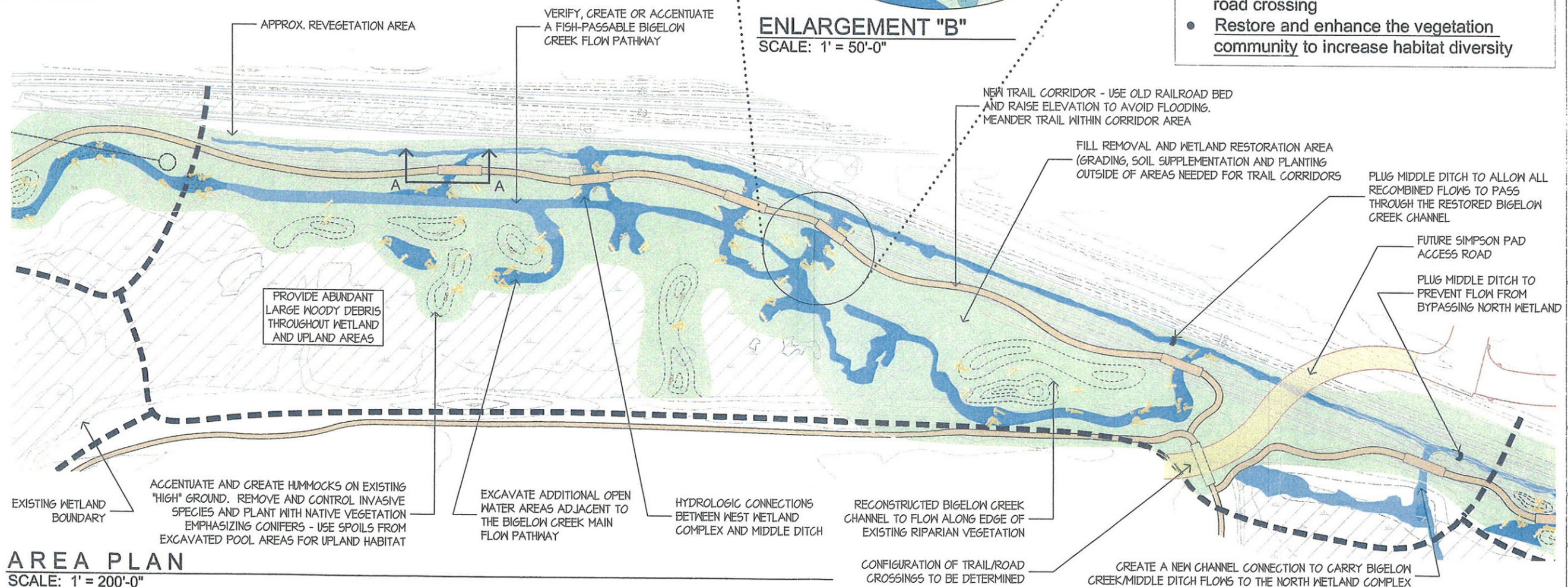


ENLARGEMENT "B"
SCALE: 1' = 50'-0"



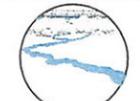
PROPOSED ENHANCEMENTS

- Expand the West Wetland Complex by incorporating portions of adjoining areas now occupied by to-be-abandoned railroad tracks and the associated "Middle Ditch"
- Increase open water habitat and provide a distinct Bigelow Creek flow pathway for fish passage
- Provide wetland and riparian connectivity between the North and West Wetland Complexes at the Simpson Pad access road crossing
- Restore and enhance the vegetation community to increase habitat diversity



AREA PLAN
SCALE: 1' = 200'-0"

PROGRAM ELEMENT 3: RECONNECTION OF THE WEST AND NORTH WETLAND COMPLEXES VIA A REVITALIZED BIGELOW CREEK


The Watershed Company
1410 Market Street
Kirkland, WA 98033
425.822.5242 Fax: 425.827.8136
watershed@watershedco.com
www.watershedco.com

CLIENT:
CITY OF EVERETT

ADDRESS:
BIGELOW EVERETT ENHANCEMENT AREA; EVERETT, WA

TITLE:
ENHANCEMENT PROGRAM ELEMENT 3

JOB NUMBER: **040712**

SHEET NUMBER: **3-2**



Program Element 4: Relocation & Daylighting Bigelow Creek Channel

Opportunity: *To restore and showcase Bigelow Creek in a more typical or classic sense, presenting it as a distinct entity and demonstrating stream habitat functioning somewhat independently from the influences of the nearby and adjoining wetlands and the Snohomish River. To restore this stream channel section to include pool and riffle sequences with in-stream rearing habitat for coho salmon and/or cutthroat trout and clean gravel to provide a limited amount of spawning habitat.*

Existing Conditions: Presently, Bigelow Creek flows are carried by ditches, culverts, and swales on both sides of the railroad tracks bordering the west side of the South Wetland Complex. Several stream sections are culverted. One section is long with deeply buried ends, making its present condition difficult to assess, and water spills around it and over an access road in response to storm events. Existing vegetation in this area is dominated by non-native, invasive species of diminished benefit to wildlife including reed canarygrass, bittersweet nightshade, Himalayan blackberry, and others. There is virtually no wood in the existing ditched stream channel sections and substrates consist primarily of sands and silts.

Enhancement Rationale: This upper section of Bigelow Creek provides the best opportunity on-site to restore and showcase the stream as a distinct entity and provide more typical stream (as opposed to wetland or beaver pond) habitat functioning for use by coho salmon and cutthroat trout. Downstream, through the West and North Wetland Complexes, Bigelow Creek is not an entirely distinct stream feature; its form and functions are difficult to separate from the localized wetland areas or the overall river estuary. In those areas, the stream can be thought of as just one of several water sources feeding the wetlands, the others including flood and tidal pulses from the river and various other dispersed and indistinct groundwater seepages. The upper section is distinct, in part, because stream gradients are, and/or have the potential to be, moderately increased, making the establishment of differently functioning habitat types feasible and desirable. Removing or shortening existing culverts along the upper section also provides opportunities for daylighting now-piped stream sections.

Proposed Enhancements

Relocate and restore the channel of Bigelow Creek.

- Given that the mainline railroad tracks adjoining this section are to remain and may be expanded, relocate the stream channel eastward, away from the tracks, to allow for establishment of a functional riparian buffer.
- Restore the relocated stream channel section to include pool and riffle sequences to provide classic in-stream rearing habitat for coho salmon and/or cutthroat trout, along with a clean gravel substrate to provide a limited amount of spawning habitat.
- Place numerous log structures in and along the relocated stream section to provide in-stream cover and structure, and to maintain pool habitat through localized scouring of the streambed.
- Remove and/or shorten existing culverts, eliminating or replacing them with bridges as feasible, thereby daylighting presently piped stream sections.

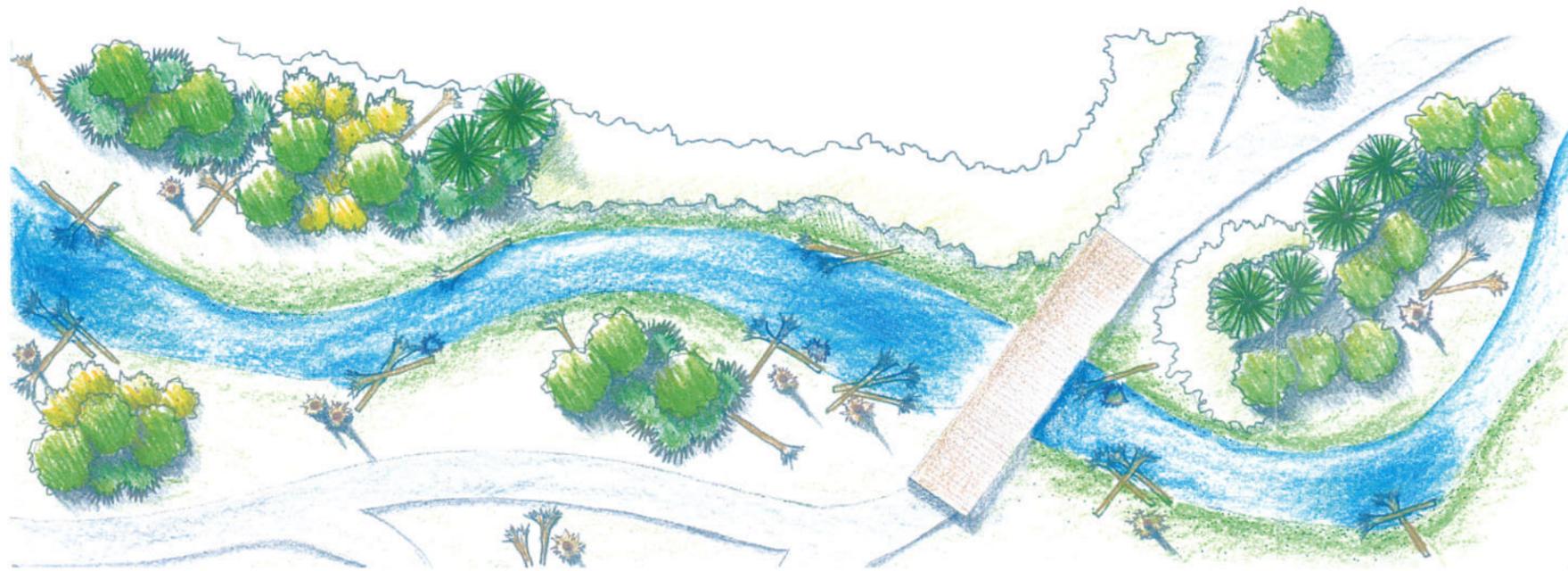
Restore the buffer of Bigelow Creek.

- Remove remaining non-native, invasive plants.
- Replant the newly defined buffers of the relocated and otherwise reconstructed stream channel with a dense and diverse assemblage of native plants well-suited to localized conditions. Such vegetation will provide shade, bank stability, a source of terrestrial insects as a food supply for fish, and small and large woody debris recruitment. Conifer trees, especially, are lacking and would provide a beneficial feature to the overall habitat.



NO.	DATE	REVISION

PROJECT MANAGER: MC
 DESIGNED: GJ DRAFTING: MC
 CHECKED: BW FILE: haw-wa2

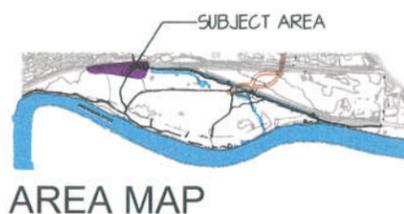
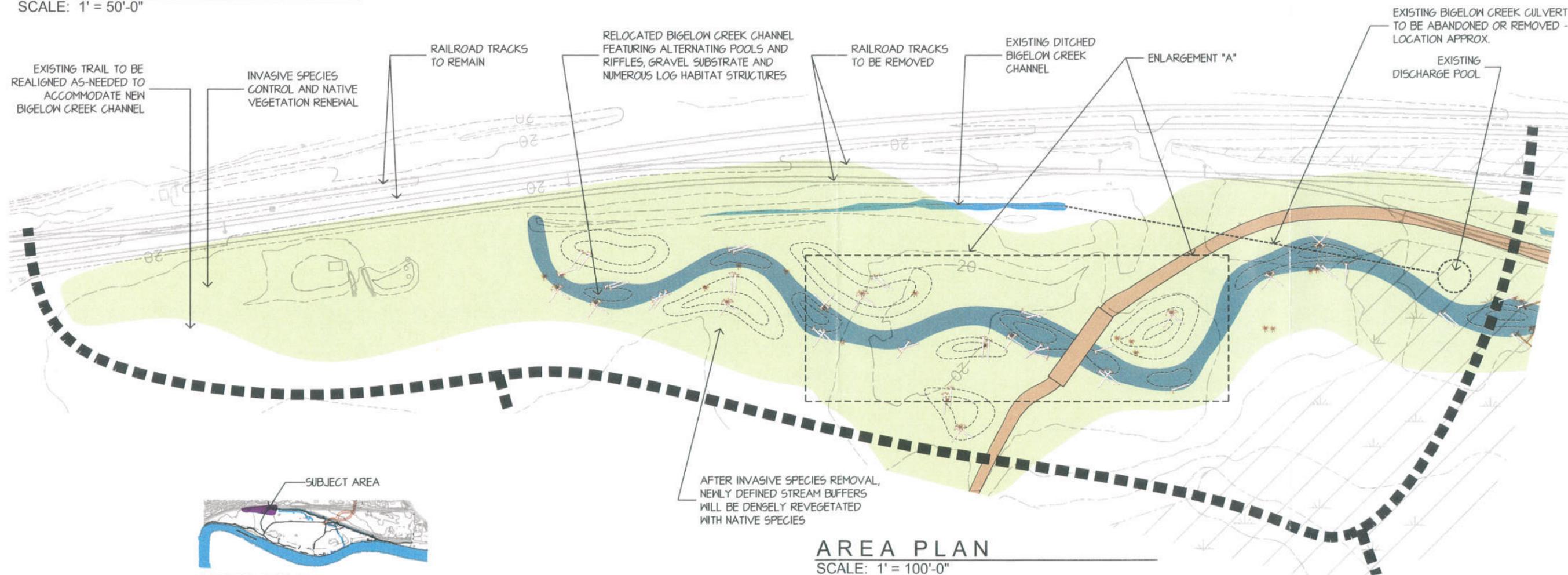


PROPOSED ENHANCEMENTS

- Relocate the stream channel eastward, away from the railroad tracks, to allow for establishment of a functional buffer
- Re-create a new stream channel with pool and riffle sequences and a clean gravel substrate to provide habitat for coho salmon and cutthroat trout
- Place numerous log habitat structures in and along the new stream channel
- Eliminate or shorten culverts, thereby daylighting now-piped stream sections
- Remove remaining non-native, invasive plants
- Replant the newly defined stream buffers with native trees and shrubs suited to available sun, soils, and moisture conditions to provide shade, bank stability, food sources, and woody structure. Conifer trees, especially, are now lacking

ENLARGEMENT "A"

SCALE: 1' = 50'-0"



AREA PLAN

SCALE: 1' = 100'-0"

PROGRAM ELEMENT 4: RELOCATION & DAYLIGHTING OF BIGELOW CREEK CHANNEL



The Watershed Company
 1410 Market Street
 Kirkland, WA 98033
 425.822.5242 Fax: 425.827.8136
 watershed@watershedco.com
 www.watershedco.com

CLIENT:
CITY OF EVERETT

ADDRESS:
 BIGELOW EVERETT
 ENHANCEMENT
 AREA; EVERETT, WA

TITLE:
 ENHANCEMENT
 PROGRAM
 ELEMENT 4

JOB NUMBER: 040712

SHEET NUMBER: 4-2



Program Element 5: North Wetland Complex, Middle Ditch & Bigelow Creek Connections

Opportunity: *To expand the North Wetland Complex by incorporating portions of adjoining areas now occupied by to-be-abandoned railroad tracks and an associated ditch feature referred to as the “Middle Ditch.” To direct restored Bigelow Creek flows through the heart of the North Wetland Complex, thereby providing an unimpeded passage for water, fish, and wildlife. To facilitate a trail segment along the west side of the North Wetland Complex providing scenic views, interpretive functions, and a vital connection to the regional trail network. To incorporate stormwater treatment bioswales for the adjoining future development.*

Existing Conditions: Railroad tracks constructed decades ago presently bound the west side of the North Wetland Complex, cutting it off from portions of the floodplain that it previously occupied. Two drainage ditches parallel these tracks with the “Middle Ditch” carrying flow northward between the sets of tracks. Present flows in the Middle Ditch are derived from Bigelow Creek, a salmonid fish-bearing stream that passes through the West and North Wetland Complexes en route to the Snohomish River. The Middle Ditch has acted to capture and redirect some of Bigelow Creek’s flow along a separate route, which bypasses the North Wetland Complex. Program Element 5 will revive hydrological connections between the North Wetland Complex and the former wetland floodplain areas, including the redirection of Bigelow Creek flows through the wetland en route to the Snohomish River.

Enhancement Rationale: Expanding the North Wetland Complex to include the Middle Ditch and areas now occupied by to-be-abandoned railroad tracks will further increase wildlife benefits, increasing the area and quality of available habitat. Sufficient portions of the railroad grades can be retained to provide for a trail with regional connections, views, interpretive and recreational functions, and stormwater treatment bioswales. Additional enhancements for improved habitat quality and diversity in existing wetland areas also will provide dramatic aesthetic and environmental education benefits.

Proposed Enhancements

Expand the North Wetland Complex westward.

- Remove sections of the to-be-abandoned railroad grade prism by excavating to hydraulically connect the Middle Ditch wetlands and the North Wetland Complex. Grade areas to accommodate native vegetation for habitat improvement and incorporation of future stormwater treatment bioswales for adjoining development.
- Plug the Middle Ditch approaching its present mouth at the Snohomish River, redirecting its hydrologic connection to the river exclusively through the North Wetland Complex.
- Extend the existing Lowell River Trail northward from its present end at the northwest corner of the Simpson Development Pad. An elevated boardwalk section of trail across emergent, scrub-shrub, and open water areas in the southwest corner of the North Wetland Complex is envisioned, providing unparalleled interpretive opportunities.

Restore and enhance the vegetation community.

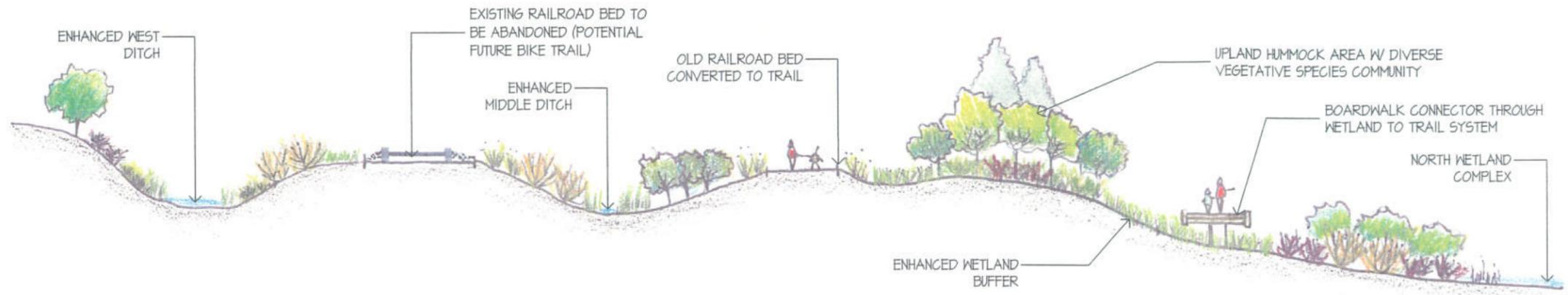
- Remove and control invasive, non-native vegetation and increase the prevalence and diversity of native wetland, riparian, and transitional fringe vegetation.
- Use excavated spoils to create hummocks to support upland and transitional forest vegetation to provide perches/snags for birds, large woody debris recruitment, and to further diversify habitat.
- Plant conifer species on banks and hummocks to eventually provide large woody debris recruitment and serve as perches/snags for numerous bird species, particularly ospreys and bald eagles.
- Enhance West Ditch wetlands, to remain hydrologically distinct from the North Wetland Complex.



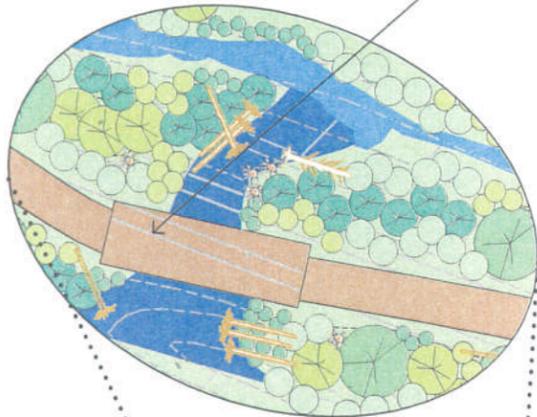
NO.	DATE	REVISION

PROJECT MANAGER: KC
 DESIGNED: CJ | DRAFTING: MG
 CHECKED: BW | FILE: 1000-002

TRAIL SECTION OVER HYDROLOGIC CONNECTION FROM THE MIDDLE DITCH TO THE NORTH WETLAND COMPLEX. PROVIDE LARGE WOODY DEBRIS AND VEGETATION ENHANCEMENT - BOTH UPLAND AND WETLAND

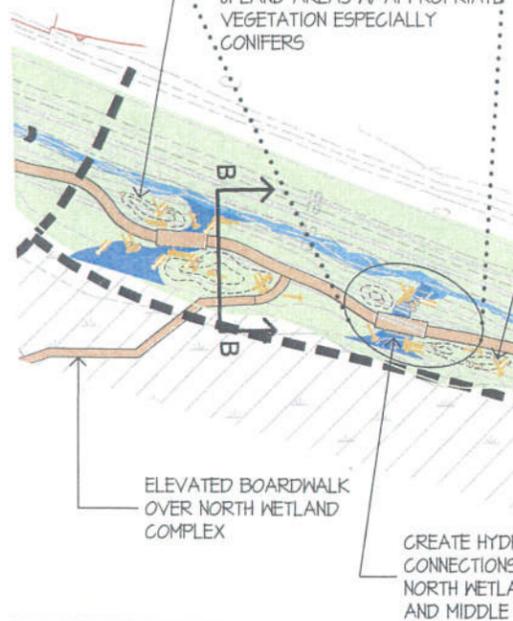


SECTION "B"
NOT TO SCALE



ENLARGEMENT "A"
SCALE: 1' = 50'-0"

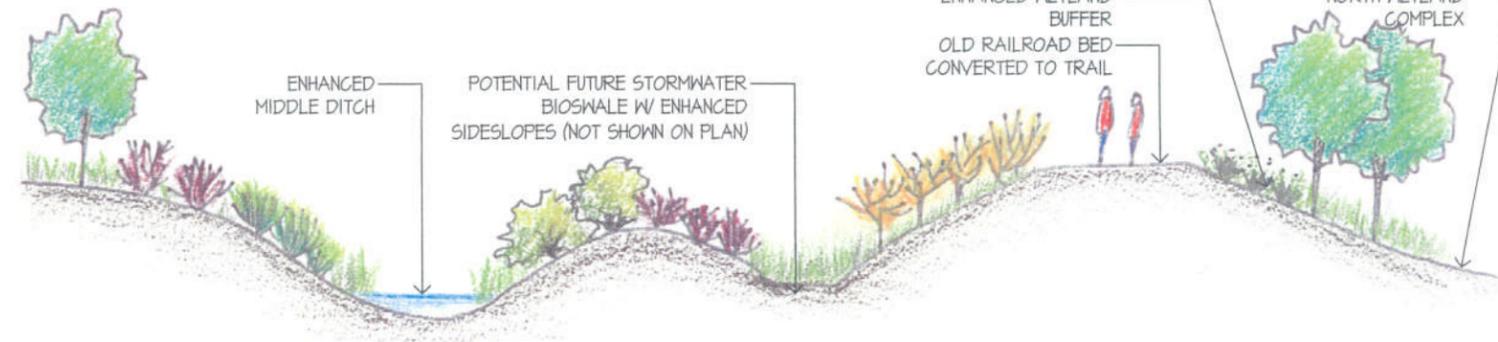
CREATE HUMMOCKS W/ FILL SPOILS, PROVIDE SNAGS AND LARGE WOODY DEBRIS. PLANT UPLAND AREAS W/ APPROPRIATE VEGETATION ESPECIALLY CONIFERS



ELEVATED BOARDWALK OVER NORTH WETLAND COMPLEX

CREATE HYDROLOGIC CONNECTIONS BETWEEN THE NORTH WETLAND COMPLEX AND MIDDLE DITCH

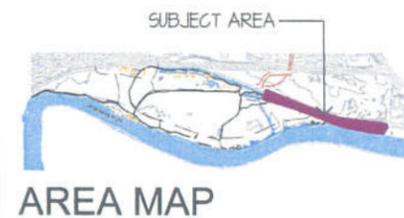
PROVIDE ABUNDANT AMOUNT OF LARGE WOODY DEBRIS THROUGHOUT UPLAND, WETLAND AND CHANNELS
 POSSIBLE FUTURE STORMWATER TREATMENT BIOSWALE(S) AREA (NOT SHOWN ON PLAN, SEE SECTION C)
 ENHANCE WETLAND AND TRANSITIONAL VEGETATION ALONG WEST DITCH



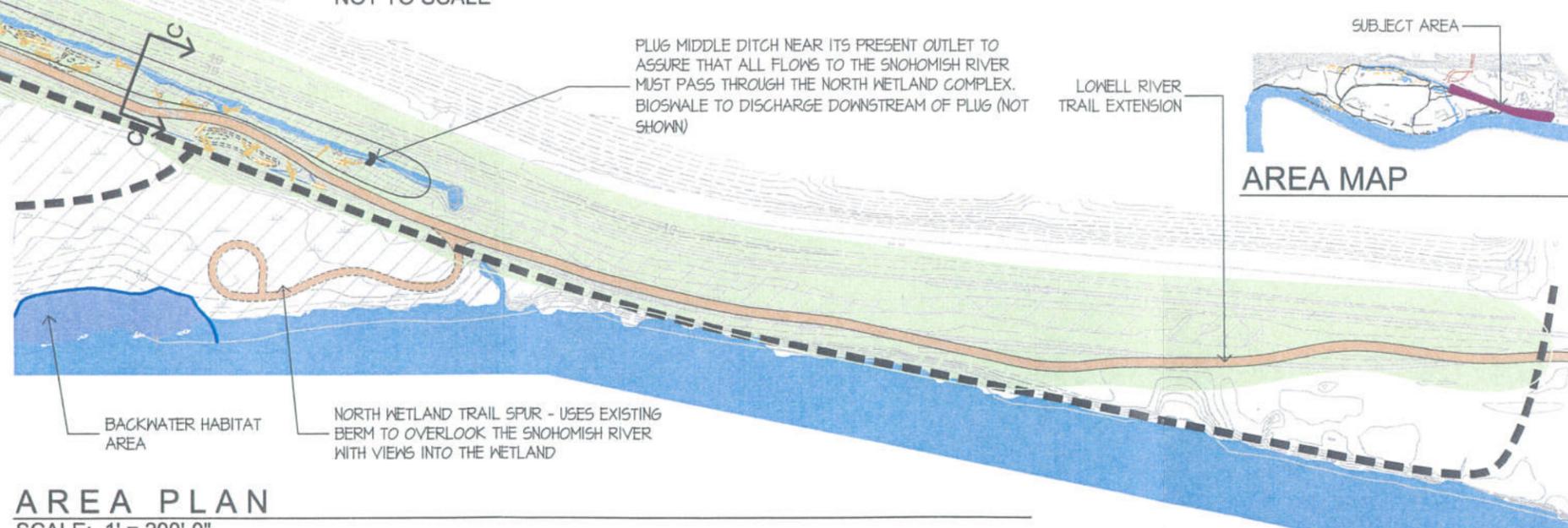
SECTION "C"
NOT TO SCALE

PLUG MIDDLE DITCH NEAR ITS PRESENT OUTLET TO ASSURE THAT ALL FLOWS TO THE SNOHOMISH RIVER MUST PASS THROUGH THE NORTH WETLAND COMPLEX. BIOSWALE TO DISCHARGE DOWNSTREAM OF PLUG (NOT SHOWN)

LOWELL RIVER TRAIL EXTENSION



AREA MAP



BACKWATER HABITAT AREA

NORTH WETLAND TRAIL SPUR - USES EXISTING BERM TO OVERLOOK THE SNOHOMISH RIVER WITH VIEWS INTO THE WETLAND

AREA PLAN
SCALE: 1' = 200'-0"

PROPOSED ENHANCEMENTS

- Expand the North Wetland Complex westward by incorporating portions of adjoining areas now occupied by to-be-abandoned railroad tracks and the associated "Middle Ditch"
- Plug the Middle Ditch approaching its present mouth at the Snohomish River, redirecting its hydrologic connection to the river exclusively through the North Wetland Complex
- Reconstruct railroad bed to incorporate stormwater treatment bioswales from adjoining development (outlet to middle ditch)
- Extend the existing Lowell Riverfront Trail northward. The trail would feature viewpoints, interpretive areas, and an elevated boardwalk
- Restore and enhance the vegetative community to increase habitat diversity by removing non-native, invasive vegetation and replacing it with native species, with an emphasis on conifer trees
- Enhance wetland areas along the West Ditch, to remain hydrologically distinct from the North Wetland Complex

PROGRAM ELEMENT 5: NORTH WETLAND COMPLEX, MIDDLE DITCH & BIGELOW CREEK CONNECTIONS



The Watershed Company
 1410 Market Street
 Kirkland, WA 98033
 425.822.5242 Fax: 425.827.8136
 watershed@watershedco.com
 www.watershedco.com

CLIENT:
CITY OF EVERETT

ADDRESS:
 BIGELOW EVERETT ENHANCEMENT AREA; EVERETT, WA

TITLE:
ENHANCEMENT PROGRAM ELEMENT 5

JOB NUMBER: 040712

SHEET NUMBER: 5-2



Program Element 6: Interpretive Center

Opportunity: *To provide the public with an educational, enjoyable and entertaining resource that will foster interest in and appreciation for the ecological, cultural and social history of the site.*

Existing Conditions: The existing on-site trail network and the Rotary Park parking lot at the south end of the Riverfront Properties are the only presently developed features that can form the framework for design of an interpretive center and interpretive areas. The parking lot location is a key factor in siting the primary interpretive center to facilitate convenient and safe access. Other features that influence interpretive center development include the layout of the unique habitat types on the site; locations of any on-site historical or Native American uses; and off-site views of biologically, historically or culturally significant areas.

Enhancement Rationale: Providing educational and passive recreational opportunities in shoreline public access areas is encouraged in numerous sections of the City's *Shoreline Master Program (SMP)*. Specifically, the SMP includes a management policy that states the following: "Manage the Simpson wetlands and Bigelow Creek for wildlife habitat, water quality, and educational values."

Proposed Enhancements

Construct an Interpretive Center that provides convenient and safe access.

- Locate the Interpretive Center near the current trailhead and public parking area at the south end of the site.

Construct an Interpretive Center and interpretive network that provides biological, historical and cultural educational materials.

- Provide exhibits and materials that explore the Native American uses of the estuary and river mouths: e.g., fishing, transportation, locations of seasonal encampments and permanent villages. This would provide an opportunity for local tribes to "tell their story."
- Provide exhibits and materials that explore the way Native Americans utilized vegetation found on the site: e.g., cattails for food and wall mats; western red cedar trees for canoes, baskets, boxes, housing.
- Provide exhibits and materials that explore the historical transformation of the flood plain and estuary to accommodate agricultural uses; historical use of the river as a primary transportation and industrial corridor; and historical use of the site by the Simpson Mill.
- Demonstrate effective stormwater management techniques, such as biofiltration.
- Demonstrate effective and experimental habitat restoration techniques.
- Look into providing real-time fish-run size estimate updates from sonar-type counting devices in the river near the Interpretive Center.

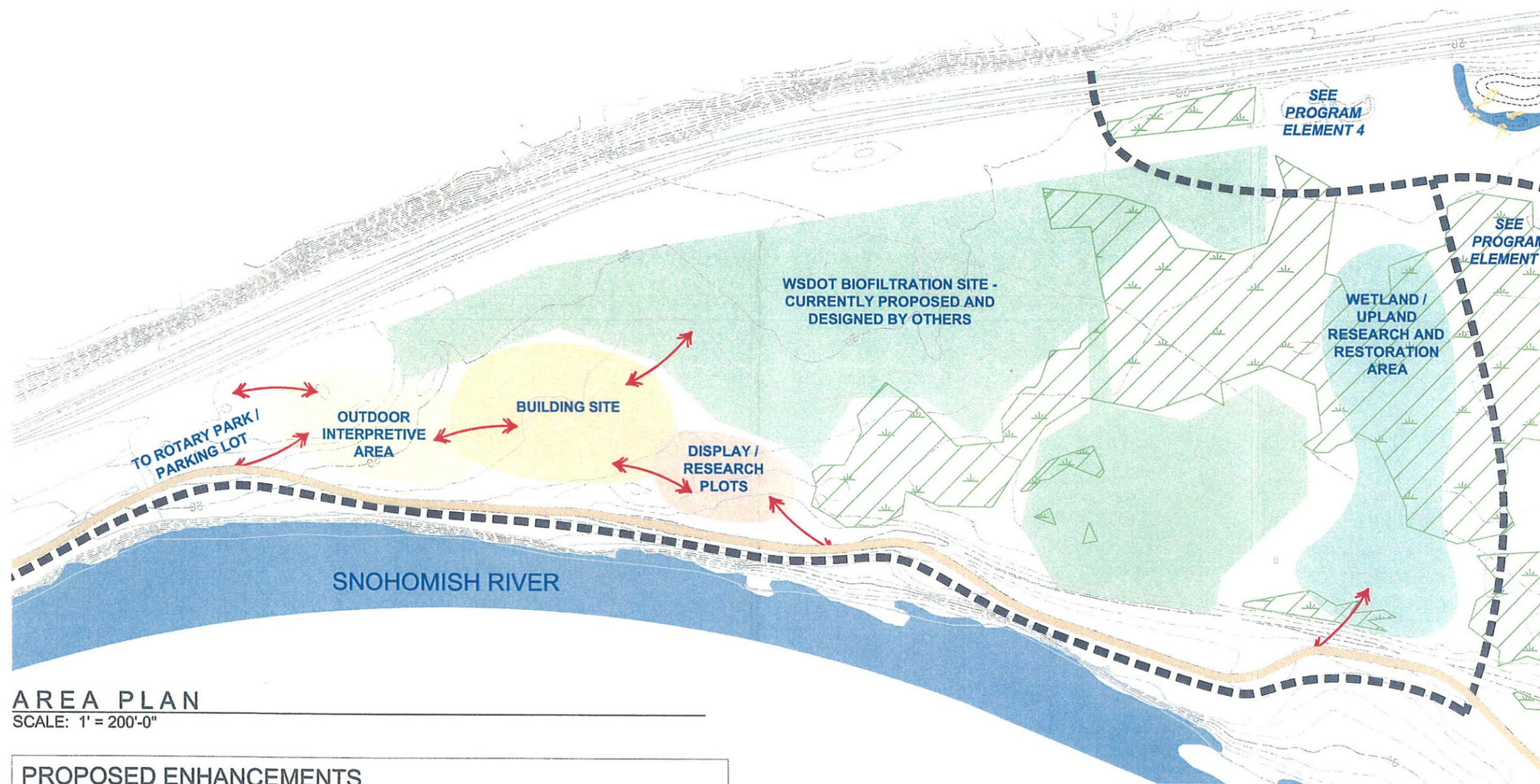
Establish the Riverfront Properties area as a center for scientific study and field investigation.

- Scientific study could involve assessing fish and wildlife habitat functioning and needs, evaluating effectiveness of various restoration and enhancement techniques, comparing the effectiveness of various stormwater treatment methods, monitoring local and regional pollutant levels, estimating salmonid population and run size estimates based on smolt abundance and usage of restored estuarine areas, and investigating local archeology and history.



NO.	DATE	REVISION

PROJECT MANAGER: KC
DESIGNED: GJ | DRAFTING: MC
CHECKED: BW | FILE: Ecom-1022

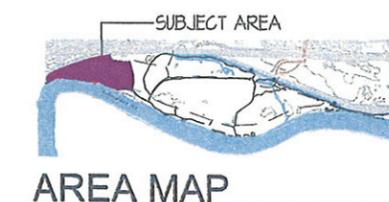


AREA PLAN

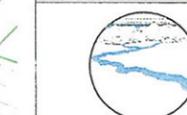
SCALE: 1" = 200'-0"

PROPOSED ENHANCEMENTS

- Construct an Interpretive Center that provides convenient and safe access near the current trailhead and public parking at the south end of the site
- Construct an Interpretive Center as the centerpiece element of and interpretive network that provides biological, historical and cultural educational materials
- Demonstrate effective stormwater management techniques and experimental habitat restoration techniques
- Establish the Riverfront Properties area as a center for scientific study and field investigation



AREA MAP



The Watershed Company
1410 Market Street
Kirkland, WA 98033
425.822.5242 Fax: 425.827.8136
watershed@watershedco.com
www.watershedco.com

CLIENT:
CITY OF EVERETT

ADDRESS:
BIGELOW EVERETT ENHANCEMENT AREA; EVERETT, WA

TITLE:
ENHANCEMENT PROGRAM ELEMENT 6

JOB NUMBER: 040712

SHEET NUMBER: 6-2

PROGRAM ELEMENT 6: INTERPRETIVE CENTER





Program Element 7: Trail System Improvements

Opportunity: *To improve and expand the existing on-site trail network, increasing public access and passive recreation opportunities, and to provide trail connections to existing amenities to the north and south.*

Existing Conditions: Currently, a paved trail (Lowell Riverfront Trail) meanders along the Snohomish River through the eastern edge of the South and East Wetland Complexes, and then swings westward across the north side of the Simpson Development Pad. Other on-site features that may facilitate trail development include the existing BNSF railroad tracks along the west edge of the North and West Wetland Complexes, and a number of gravel and dirt roads. In Program Element 7, the existing on-site trail network will be improved and expanded to provide increased public access and passive recreation opportunities.

Enhancement Rationale: Providing public access to the City's shorelines, which include the Snohomish River, is one of the primary objectives of the City's *Shoreline Master Program* (SMP). Public access is defined in the City's SMP as "the ability of the public to reach, touch, and enjoy the water's edge, ... or to view the water and the shorelines..." The SMP also expresses a commitment to "...protect and maintain existing public access, to restore and reclaim public access, and to provide safe and meaningful public access, use and enjoyment of Everett's shorelines." This is further supported by the City's *Shoreline Public Access Plan* which presents strategies to establish a continuous system of trails, parks, and attractions. Program Element 7 has the potential to provide public access along a significant section of Snohomish River shoreline that was previously isolated by the BNSF railroad.

Proposed Enhancements

Improve and expand the on-site trail system.

- Improve and formalize existing on-site network of trails, roads and paths to provide opportunities for enjoying the variety of habitat types on the Riverfront Properties.
- After purchase and decommissioning of the BNSF railroad beds, convert selected areas and alignments to new trails.
- Construct a raised boardwalk connecting the existing trail on the north side of the Simpson Pad to a continuation of the trail along the railroad grades bordering the west side of the North Wetland Complex. The boardwalk would include a crossing of Bigelow Creek and traverse the North Wetland Complex, both of which would provide additional educational opportunities.
- Provide trail segments and interpretive elements to showcase restored sections of Bigelow Creek that will provide classic in-stream rearing and some spawning habitat for coho salmon and/or cutthroat trout.
- Provide parking.

Provide connections to a regional trail system.

- Rotary Park is an 11.3-acre park on the Snohomish River south of the Riverfront Properties. The Park includes a boat launch, boat parking, trails and other amenities. A connection between Rotary Park and the Riverfront Properties would provide a significant contribution to the regional network.
- Construct a trail connection to the Regional Transit Center north of the Riverfront Properties.

Provide direct river access.

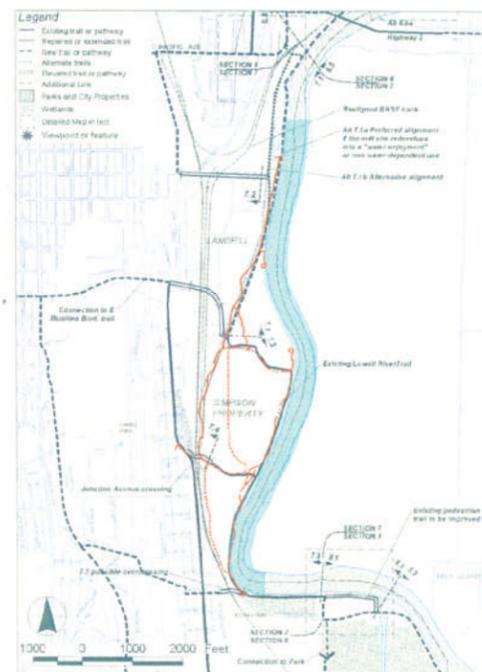
- Construction of a boat launch is a potential enhancement that would provide river access for activities such as fishing, kayaking and canoeing, bird watching, exploring, and exercising, up- and downstream along the river and in connecting waterways.



NO.	DATE	REVISION

PROJECT MANAGER: KC
 DESIGNED: GJ DRAFTING: MC
 CHECKED: BW FILE: baw-enc2

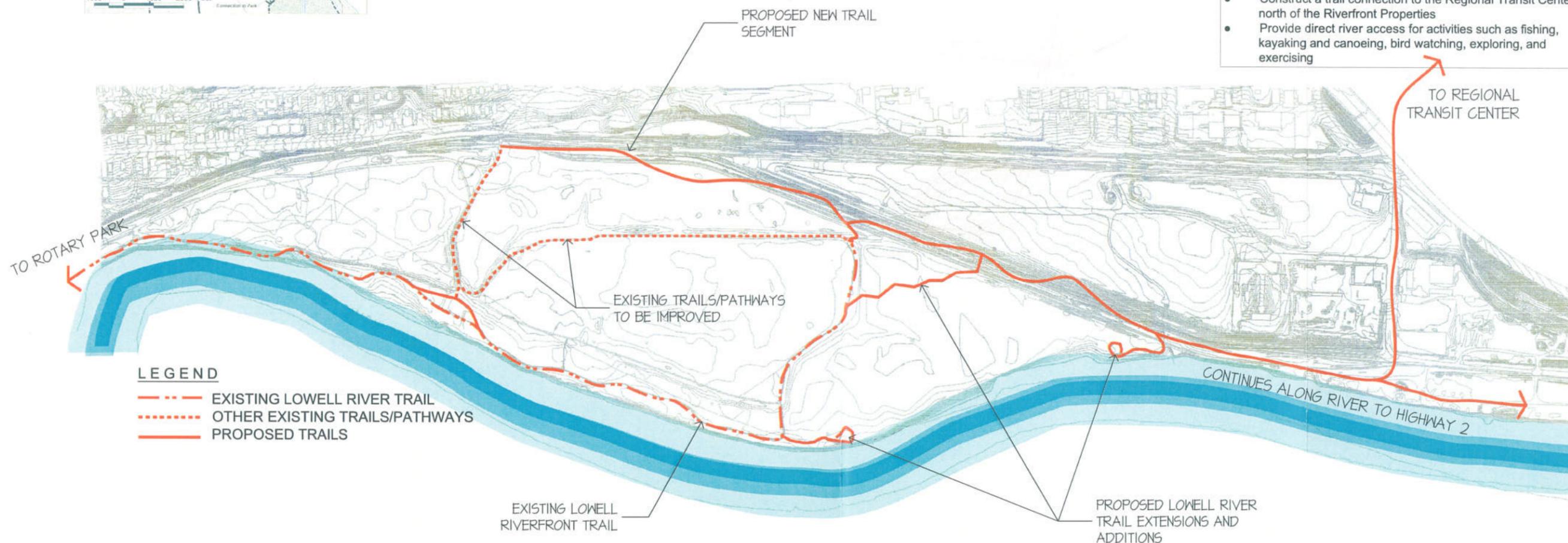
Regional Trail System



SNOHOMISH RIVER IN FLOOD

PROPOSED ENHANCEMENTS

- Improve and expand the on-site trail system to provide opportunities for enjoying the variety of habitat types and showcasing restoration within the Riverfront Properties
- Construct raised boardwalks through wetlands connecting adjacent trails
- Provide parking and connections to the regional trail system and Rotary Park
- Construct a trail connection to the Regional Transit Center north of the Riverfront Properties
- Provide direct river access for activities such as fishing, kayaking and canoeing, bird watching, exploring, and exercising



LEGEND

- · · · — EXISTING LOWELL RIVER TRAIL
- · · · — OTHER EXISTING TRAILS/PATHWAYS
- — — PROPOSED TRAILS



The Watershed Company
 1410 Market Street
 Kirkland, WA 98033
 425.822.5242 Fax: 425.827.8136
 watershed@watershedco.com
 www.watershedco.com

CLIENT: CITY OF EVERETT

ADDRESS: BIGELOW EVERETT ENHANCEMENT AREA; EVERETT, WA

TITLE: ENHANCEMENT PROGRAM ELEMENT 7

JOB NUMBER: 040712

SHEET NUMBER: 7-2

PROGRAM ELEMENT 7: TRAIL SYSTEM IMPROVEMENTS

