



City of Bellevue  
Department of Planning & Community Development  
Development Services  
Land Use Staff Report, Environmental Review and  
State Environmental Policy Act Threshold Determination

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Proposal Name: Weinstein Stream and Shoreline Restoration

Proposal Address: 73 & 75 Skagit Key

Proposal Description: Applicant proposes to restore and enhance portions of Coal Creek at its mouth where it bisects his property at 73 and 75 Skagit Key. The project includes: bank and buffer restoration incorporated with a flood control berm and channel enhancements, including placement of in-stream habitat structures. In addition to stream enhancement, the applicant proposes to construct buffer mitigation and a pedestrian footbridge associated with the construction of a single family residence at 75 Skagit Key. Both sites are encumbered by Coal Creek, its associated buffers, floodplain and an associated wetland of Lake Washington.

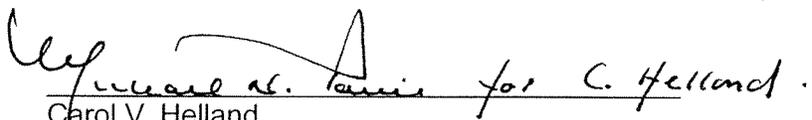
File Number: 06-115928 WG

Applicant: William Weinstein

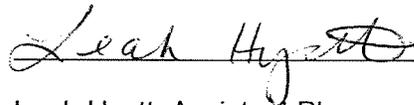
Decisions Included: Shoreline Substantial Development Permit  
Land Use Code 20.30R

Planner: Leah Hyatt, Assistant Planner

State Environmental Policy Act  
Threshold Determination: **Mitigated Determination of Non-Significance (MDNS)**

  
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Carol V. Helland,  
Environmental Coordinator

Director's Decision: **Approval with Conditions**

  
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Leah Hyatt, Assistant Planner  
Department of Planning and Community Development

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Application Date: June 2, 2006

Notice of Application: June 29, 2006

Bulletin Publication Date: November 30, 2006

Appeal Deadline: December 21, 2006, or 21 days from the date of filing with  
Department of Ecology

For information on how to appeal a proposal, visit the Permit Center at City Hall or call 425-452-6864. Comments on State Environmental Policy Act (SEPA) Determinations can be made with or without appealing the proposal within the noted comment period for a SEPA Determination. Appeal of the decision must be made by 5 p.m. on the date noted for appeal of the decision. Appeals must be made to the Washington State Shoreline Hearings Board.

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## I. Request/Project Description

The applicant is proposing to restore and enhance portions of Coal Creek as it passes between 73 and 75 Skagit Key.

The following elements are included as part of the proposal:

1. Riparian Corridor Restoration: Sedimentation impacts in the project reach have raised the elevation of the streambed, causing a section of the bank on the south side of the stream to be overtopped during flood events. A new flood control berm is proposed that will replace existing sandbags left in place. The berm will be constructed as multiple layers of coir wrapped topsoil. Each lift will be a maximum of 1' in height. The face and top of each berm will be staked with a total of 420 live willows.
2. Enhanced Salmon Channel: Sedimentation impacts have resulted in an extensive delta of sand and gravel extending approximately 270 feet beyond the mouth of Coal Creek into Lake Washington. During low-lake conditions (fall through spring), Coal Creek creates a number of small meandering channels through the delta or sheet flows across the delta. The proposal would provide a number of in-stream log habitat structures throughout the project reach, and install a series of log weirs extending out into the delta such that Coal Creek flows would be directed through and over them, creating a fish passable primary channel. Four V-logs, 16 fallen trees and 26 revetment logs and rootwads shall be placed within the channel. The proposed V-logs will be either Douglas Fir or Western Red Cedar logs with rootwads attached in 16' long and minimum 12" diameter at tip. Each pair of V-logs are to be attached to three anchors. The proposed revetment logs will either be Douglas Fir or Western Red Cedar a minimum of 16' long and a minimum 12" in diameter at the tip. Two of every three revetment logs shall have rootwad intact and each one shall be attached with one anchor. The proposed fallen trees shall be either Douglas Fir or Western Red Cedar a minimum of 16' in length and 12" in diameter. Anchors shall consist of manta ray earth anchors or the equivalent. Anchors will be driven a minimum 4' into the ground at an angle approximately 30 degrees from vertical aimed away from the center of the channel and upstream. All anchors are to be load tested to a minimum of 12,000 pounds which is sufficient force to anchor logs entirely submerged in a flow of 10' per second. As needed, pools would be excavated in the channel so that logs would provide functional habitat at low flows. Also included in the proposal are placed log complexes which are intended to provide the scour needed to maintain the pools around them over time.
3. Footbridge: The applicant proposes to build a footbridge across Coal Creek between 73 and 75 Skagit Key; it is the applicant's intention to have two homes on separate lots connected by a footbridge and trail.

A Section 7 Biological Assessment was prepared by The Watershed Company, dated March 21, 2006. This assessment analyzed the impacts of the project in order to meet Section 7 Endangered Species Act (ESA) requirements. Section 7(c) of the ESA requires federal agencies to contact the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) before the beginning of any construction activity. This is in order to determine if any species listed as threatened or endangered by the federal government

may be present in the project area. Additional information about this assessment is discussed in Section IV, State Environmental Policy Act, of this report.

## **II. Site Description and Context**

The sites are in the R-2.5 land use district; both are designated Single Family-Medium Density in the Factoria Subarea of the Comprehensive Plan. Together, both properties are approximately 61,300 square feet (1.40 acres). The two sites are divided by Coal Creek which passes between the two properties and empties via a large delta into Lake Washington. The 50-foot primary buffer and 100-year floodplain associated with Coal Creek encumber both lots; an associated wetland of Lake Washington encumbers the more northerly lot at 75 Skagit Key.

The south bank of Coal Creek abuts 73 Skagit Key and the north bank abuts 75 Skagit Key; both properties have Lake Washington frontage. 73 Skagit Key includes an existing single family home, lawn and landscaping. Along the stream bank of 73 Skagit Key, riparian vegetation consists primarily of mowed lawn, with a weedy herbaceous component downstream. A few willow sprouts are also rooted in the bank. Near the upstream end of the property, adjacent to the residence, are rhododendrons, a few birches, western hemlocks and a maple. A portion of the bank was reinforced with sand bags several years ago to prevent flooding of the house. There are a few bank areas that have been armored with large angular rock, including Lake Washington frontage. Recent armoring is evident abutting at the mouth of Coal Creek.

The site at 75 Skagit Key is currently undeveloped. A Protected Area Development Exception (PADE) was approved by the City of Bellevue on January 31, 2001 to construct a single family residence and building permits have been applied for. The eastern third of the site is upland, consisting primarily of grasses and Himalayan blackberry in the open portion. The wooded riparian area includes black cottonwood, red alder, Pacific and other willows, big leaf maple, birch, Douglas fir, western red cedar, Oregon ash and Sitka spruce, as well as a diverse mix of native shrubs. Most of these species were installed in 2001 as part of a buffer restoration plan. The western two-thirds of 75 Skagit Key is a forested and emergent wetland. The dominant vegetation includes red alder, black cottonwood, Pacific and other willows, red osier dogwood, hardhack, cattail, reed canary grass, common horsetail and iris. Previously installed enhancement plantings within the wetland also include cedar, birch, ash, native rose, salmonberry and twinberry.

## **III. Consistency with Land Use Code/Zoning Requirements**

The site is within a Sensitive Areas Overlay District and is subject to the regulations and performance standards of 20.25H for development within an Area of Special Flood Hazard, Riparian Corridor and Wetland. (The project is vested under the 1987 Critical Areas Code and not subject to the August 1, 2006 Critical Areas update). The site is in the Shoreline Overlay District and is subject to the regulations regarding Shoreline Protection (Land Use Code (LUC) Section 20.25.080.S) and Clear & Grading within the Shoreline Overlay District (LUC Section 20.25E). As conditioned, the proposal complies with these requirements.

#### **Area of Special Flood Hazard (LUC Section 20.25H.110.A)**

A fairly wide and somewhat active floodplain occurs along the north side of the stream approaching the mouth, consisting of the upper part of the delta area. At low lake levels, this area consists of mud/sand/gravel flats. The width/depth dimensions of the Coal Creek Channel on and in the vicinity of the project site appear to be at risk with respect to carrying the flows experienced by the creek. However, the active floodplain area to the north of the stream, through the project reach, tends to moderate the potential impacts of these flows and, as a result, the physical form and function of the channel just upstream of the mouth are in relatively good shape with moderately stable stream banks.

The proposed footbridge is an allowed use within an Area of Special Flood Hazard per LUC Section 20.25H.080.B when connecting more than one single-family lot. As conditioned, the bridge does not alter the flood carrying capacity or configuration of volume of the floodplain associated with Coal Creek. The footbridge is designed to minimize the disturbance within the floodplain so that it retains its natural character. The cumulative effect of the proposed development adjacent to and encroaching within the floodplain may not increase the water surface elevation of the base flood elevation. Refer to Section X for a related condition of approval.

#### **Riparian Corridors (LUC Section 20.25H.110.C)**

The streambed substrate adjacent to and near the project site at and near the mouth of Coal Creek at Lake Washington consists primarily of medium sized gravel with abundant sandy fines and with some mine tailing wastes including coal particles of various sizes. This gravel is considered to be unsuitable for the spawning of salmonid fish due to the prevalence of the fines which tend to fill interstitial spaces between the gravel particles. This condition is not necessarily considered detrimental in the low-energy delta setting; areas of more suitable spawning gravel are found along higher-gradient stream reaches upstream of the project area.

Only a minor amount of woody structure presently exists in the lower reaches of Coal Creek, including the project area and vicinity. A number of pool and riffle sequences occur along the reach, although the pools are shallow and lacking in cover. The flattening gradient approaching the mouth of the creek and high level of bed loads carried by the creek tends to prevent the formation of deeper pools, particularly with the relative absences of woody or other partial obstructions to cause scour.

A minor and temporary decrease in overhanging stream bank vegetation will occur as a result of project implementation to gain access to localized bank restoration and log placement areas. Once installed, the flood control berm will be restored and staked with hundreds of live native willows, which will provide increased shade and cover over time. A modest and temporary increase in the susceptibility of stream bank soils to erosion will also occur due to log structure placement at the specific locations and associated reforming of stream banks at these locations. Disturbed stream bank soils will stabilize after their first growing season following construction and will be protected in the interim with mulch, erosion control fabric and/or other protective measures. Placed log structures in excavated pools will provide an immediate and significant increase in refuge and cover for fish. As conditioned no significant adverse impact is expected. Refer to Section X for a related

condition of approval.

#### **IV. State Environmental Policy Act**

The environmental review indicates the proposal to construct a flood control berm, install channel enhancements and modify existing vegetation could potentially cause adverse environmental impacts. Chinook, Coho, and sockeye salmon utilize the shoreline of Lake Washington. Chinook and Coho salmon have been listed as threatened and candidate species, respectively, by the National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA). Bull trout are also listed as threatened under ESA by the U.S. Fish and Wildlife Service (USFWS). However, although Lake Washington is within the historical range of bull trout, no bull trout have been found recently in Lake Washington. Additionally, both resident and migratory bald eagles are known to inhabit the shores of Lake Washington.

Unmitigated, impacts to endangered and threatened fish species can be considered significant. Mitigation proposed by the applicant and required by the City sufficiently reduces the impacts to Coal Creek, the floodplain and wetland. These mitigating measures are discussed below and conditions of approval are listed in Section X, Conditions of Approval. Therefore, issuance of a Mitigated Determination of Non-Significance (MDNS) is the appropriate threshold determination under the State Environmental Policy Act (SEPA).

##### **A. EARTH AND WATER**

The subject site is relatively flat containing loose compressible soils. Based on a Geotechnical Report prepared by Earth Solutions (October 28, 2005), silty sand fill was encountered in the first approximately seven and one-half feet. Below the fill, very loose and soft compressible soils consisting of elastic silt, fat clay, fibrous peat, and organic silt soils were encountered extending to approximately 53 feet below existing grade.

Upland erosion may occur as exposed soils are mobilized by rainfall. Short-term erosion may occur along the stream bank during habitat log placement and reconstruction of the flood control berm. Runoff from the project's impervious surfaces will be directed into the proposed open water pond, supplying it with the necessary hydrology. The down slope lip of the pond is at the grade of the wetland buffer, enabling any overflow water to leak onto essentially level ground and then drain west into the wetland and ultimately into Lake Washington. No appreciable slopes occur between the pond elevation and any overflow waters will head toward Lake Washington. Water currents will carry the suspended sediment some distance from the project site, depending upon the wind patterns. Water quality in this area of Lake Washington will be impacted during construction until the sediments settle.

Coal Creek is a Type A Riparian Corridor as defined by the City of Bellevue Sensitive Areas Notebook. It is a stable and established corridor with an established floodplain which has been mapped by FEMA National Flood Insurance Program. It contains riparian habitat which includes a vegetation community that is integrated with the stream ecosystem and provides food, shelter, breeding and rearing areas for aquatic animals.

If there is a conflict between the construction window imposed by this approval and that determined by the Hydraulics Project Approval issued by the Washington State Department of Fish and Wildlife, the more restrictive requirement must be met.

**B. ANIMALS**

The site abuts Lake Washington, which is used as a fisheries breeding and rearing resource for sockeye, chinook and coho salmon, as well as other fish. The proposed development must ensure that there will be no take of chinook and coho salmon and bull trout as listed under the Endangered Species Act in order to receive development approval.

The Biological Assessment (BA) was prepared by The Watershed Company, dated March 21, 2006. The BA analyzed the impacts of the project and proposed mitigation in order to meet Section 7 ESA requirements. This document was prepared for the United States Army Corps of Engineers, which will evaluate it prior to issuing a federal permit. The conclusions of the assessment are as follows:

- Bald eagle

The proposed project area is located more than 1 mile from the nearest active bald eagle nest, but is located near numerous potential perch trees. Because the project is located greater than 1 mile from an active bald eagle nest, a timing restriction is not necessary during the bald eagle breeding season. However, because the project site is located within a bald eagle foraging area, no work may be conducted at the mouth of Coal Creek during the winter foraging period (October 31 through March 31).

*May affect, not likely to adversely affect.*

- Coastal/Puget Sound bull trout and its critical habitat

The presence of juvenile bull trout in Lake Washington is unlikely but limited to subadult and adult bull trout and would not be subjected to similar predation pressure as juveniles. Adult and subadult bull trout would avoid the littoral zone during the summer due to excessive water temperatures.

*Will not adversely modify critical habitat of the Coastal-Puget Sound bull trout.*

- Puget Sound chinook salmon and its critical habitat

Juvenile Chinook may be migrating through or rearing in the action area from January through June. These include fish that may have originated in Coal Creek as well as those produced in other tributaries and arriving in the action area via Lake Washington. Adult Chinook may pass through the action area from June through November to ascend Coal Creek and/or pass along the Lake Washington shore en route to other tributaries, including the Cedar

River.

*May affect, not likely to adversely affect, and will not adversely modify or destroy critical habitat.*

The presence of bull trout or Chinook salmon during the proposed construction period is improbable. Isolating and removing fish from specific areas where in-stream work is required will minimize potential impacts of construction activities on any sub-yearling juvenile coho. In order to minimize the impacts of construction activity on these salmonids, in water construction will be limited to July 16 through July 31 and November 16 and December 31. This restriction is adequate to minimize the probability that juvenile salmonids will be in the action area during construction.

Adverse impacts to the fish and other aquatic organisms in the lake can be mitigated by complying with conditions imposed by the state and federal agencies that also regulate development in the lake. A Joint Aquatic Resource Permit is required from the State Department of Fish and Wildlife, which will limit the times of construction to periods which will be less impacting to the fisheries resources.

#### **C. PLANTS**

Essential Fish Habitat (EFH) for the Pacific coast salmon fishery means those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and contributions to a healthy ecosystem. Potential impacts to Pacific salmon Chinook and Coho EFH will be mitigated by improving refuge and forage conditions which will continue over time resulting in additional streamside vegetation and the placement of log habitat structures. Placed log structures will accentuate pool/riffle sequencing and improve spawning and rearing conditions for salmonid fish. A minor temporary decrease in overhang streamside vegetation will result due to the removal of shrubby vegetation needed to gain access to localized areas for log structure placement and bank re-formation. Limited and temporary impacts to refuge, migration, and forage conditions along the Lake Washington shoreline and along the lowermost reach of Coal Creek may result from a temporary degradation in water quality due to the proposed construction activities. Any such impacts will be short lived and not adverse.

The work boat used for construction could disturb vegetated shallows during the implementation of the project. Vegetated shallows provide refuge and foraging habitat for juvenile salmonids and forage fish. To minimize the impacts to the vegetated shallows the barge will be stationary. In such circumstances that the substrate was disturbed by the barge the action would be temporary and minimal since the barge would not be moving around. Therefore, impacts to vegetated habitat are not significant.

#### **D. NOISE**

The site is adjacent to single-family residences whose residents are most sensitive to disturbance from noise during evening, late night and weekend hours when they

are likely to be at home.

Noise associated with the proposed project would be restricted to use of construction-related equipment. Construction noise will be limited to 7 a.m. to 6 p.m. weekdays and 9 a.m. to 6 p.m. on Saturday and will be prohibited on Sunday. All heavy equipment shall be equipped with effective mufflers in good repair. Because of the short duration of activities, this impact will be limited. Impacts are adequately mitigated by the City's Noise Ordinance (Chapter 9.18 BCC) which limits construction hours.

#### **E. UTILITIES**

A sewer line is located in the nearshore area. Lines could be broken if struck during construction, resulting in infrastructure damage and water quality degradation. Field locating the utility lines prior to construction can mitigate impacts. Refer to Section X for a related condition of approval.

### **V. Summary of Technical Reviews**

#### **Utilities**

The Utilities Department has reviewed and approved the revised plans for this project submitted on September 22, 2006 base on the hydraulic assessment by Mr. Edward McCarthy, PhD, P.E. of the Watershed Company.

Using bankfull discharge rates, McCarthy varied the Manning's Roughness coefficient factor over a range of values in an attempt to mimic the increased hydraulic roughness the logs would add. The City requested bankfull flow rates to be part of the analysis in order to isolate the hydraulic effects to the area near the proposed structures.

The City concluded the hydraulic analysis performed by The Watershed Company on behalf of Mr. Weinstein is adequate to measure the effects the proposed installation of large woody debris structures might have on the Skagit Key culvert. In short, the hydraulic analysis demonstrates only a negligible effect on the hydraulic profile through the culvert and thus the City concluded that the project will not adversely affect the flooding conditions in the vicinity.

The analysis did not evaluate flood flows or the hydraulic impact that may result from the proposed pedestrian bridge crossing the creek. This bridge is designed to minimize disturbance within the floodplain so as not to alter its capacity to pass the 100 year flood. Consequently, the lowest cord must be at least 1 ft. above the 100 year floodplain elevation of 22 NAVD 88 as determined in the Spearing Report.

<b>VI. Application Date:</b>	<b>June 2, 2006</b>
<b>Public Notice (500 feet):</b>	<b>June 29, 2006</b>
<b>Minimum Comment Period:</b>	<b>July 31, 2006</b>

Notice of Application was published in the City of Bellevue's *Land Use Bulletin* and the *King County Journal* on June 29, 2006. It was mailed to property owners within 500 feet of the project site and a Public Information Staff received one public comment from the

Muckleshoot Indian Tribe in reference to this proposal. The questions poised in the comment letter and the City's response's are discussed below.

1. ***What is the length of the proposed planted berm on the south side of the stream? What is the existing height of the berm? As proposed 29 cubic yards of coir-wrapped top soil lifts will be placed in this berm, what will be the final height of the berm?***

The elevation of the top of the existing sand bags varies from about 19.7' to about 20.2'. Per the Flood Control Berm detail on the plan sheets, the top of the proposed soil-lift berm will be the same elevation (20 NAVD88 Datum) as the existing sandbag berm.

2. ***What flood events cause the banks of Coal Creek to be overtopped?***

Immediately downstream of the Skagit Key culvert the channel has sufficient capacity to convey the 100-year storm (approximately 630-cfs). Further downstream flows as low as the calibration flow rate of 450-cfs overtop the right bank and spread across the delta. The calibration flow rate is the estimated flood flow from the February 1996 storm event where high water marks were surveyed and used to calibrate the hydraulic model.

3. ***When was the "large flood event that caused the Bellevue Fire department to construct a sand berm? Sandbags delivered at 73 Skagit Key.***

Our maintenance records go back to 1995 and the following are dates we received calls from the Weinstein's and have delivered sandbags:

11/25/95  
11/27/96  
12/29/96  
11/25/98  
1/30/06

4. ***What flood event will overtop the new berm?***

The new berms will not be appreciably higher thus the stream conveyance remains similar.

5. ***The City of Bellevue does not have any specific professionally -provided data on fish migration blockages in the vicinity of the Coal Creek delta. The City of Bellevue has only collected salmon spawning survey information since 2000 on a limited number of streams. These include the mainstem Kelsey and lower reaches of the West Tributary with occasional spawner surveys in Richards Creek.***

The Stream Team Program, through the regional Salmon Watcher Program, does have volunteers who occasionally visit sites on Coal Creek to check for spawning salmon. This information is available on the King County website at <http://dnr.metrokc.gov/wlr/waterres/salmon/reports.htm> There have been a few coho and chinook observations upstream of the Coal Creek delta; however the Salmon Watcher Program is not systematic enough in its observations to determine whether or not a partial passage barrier may exist.

- 6. How many pools will be created in Coal Creek as part of this project? How deep will the proposed pools be during high and low flows?**

Per the plan set, a “pool” will be excavated at each rootwad placed in the stream. These pools are limited in size, typically less than ½ CY, and meant primarily to facilitate placement of the rootwads in the stream such that the rootwads can be half submerged at low flow. The exception is the V-Logs, which will be placed without excavation – the tips of the logs will be pushed into the substrate rather than dug into the substrate. In places where several rootwads are together, one pool will be constructed to accommodate them all. A total of 38 pools will be excavated.

- 7. What analysis was conducted to determine that flows and sediment transport are capable of keeping a fish passable channel open for the life of the project? How does the project propose to address the natural reduced flow energy and sediment deposition in the project area?**

This is a deltaic setting, at the mouth of an urbanized stream with high peak flows and excess sediment production. At present, when the lake is lowered in the Fall by the Army Corps, returning adult salmonids must navigate through a hundred foot long sheet flow. This project will result in sequential pools forming around LWD that will serve as resting areas between spurts. This project improves fish passage problems at the mouth of Coal Creek that may exist. It is meant to help ensure that under most conditions, the flow from Coal Creek remains concentrated near the center of the existing channel and continues to carry sediment from the creek out into the lake, such that adequate depth remains for migrating fish to enter the creek. The V-Logs are designed to direct flow over them, and encourage local scour that will help keep the area around the points of each structure relatively free of sediment. Other logs are being placed to marginally reduce the channel cross section and thereby encourage sediment transport. They will, more importantly, encourage local scour around their root ends, which will help maintain pools at the root ends. These pools with LWD in them will make excellent habitat regardless of any other channel-forming benefit they may serve.

- 8. The PADE was issued January 31, 2002 – was SEPA review required at part of the approval?**

Yes

- 9. Will Coal Creek be diverted or otherwise modified to enable the pools to be excavated?**

No. The plan calls for gravel-bag and plastic barriers to isolate the work area. All flows will remain in the channel, but sections of bank between 50 and 100 feet long will be isolated from the flow by these barriers.

- 10. What is the purpose of the open water pond? How much area will need to be excavated for this pond? Where will it be located? Will it connect to Coal Creek? Will it connect to the existing wetland? During what flow events will it connect to Coal Creek? Also please provide the analysis of potential adverse affects this pond may**

***have on Coal Creek and the wetland on the north side, including but not limited to impacts to hydrology, stream temperatures, and riparian areas?***

The open water pond is outside of the 100-year floodplain. It will discharge to the wetland area adjacent to the lake. The base of the pond will be sealed with a clay liner to prevent loss of water into the substrate. Therefore the pond will have no effect on the hydrology or temperature of the stream. The pond was required as mitigation under the original PADE approval.

***11. Will Coal Creek be diverted or otherwise modified to enable the pools to be excavated?***

Yes – The stream would be temporarily diverted around specific in-stream work locations at various points in the project sequence during the anticipated period of lowest flow. Fish would be removed from such isolated channel sections before they dried up by electrofishing, netting and or other means and transferred, unharmed to flowing channel sections upstream or downstream of the project area.

***12. Was the open water pond is required mitigation under the previously approved PADE?***

Yes

***13. How much rock and what sizes is found on Coal Creek and Lake Washington at 75 Skagit Key and 73 Skagit Key?***

Approximately 90 feet of older rip-rap bank armoring exists on the south bank of Coal Creek in the vicinity of cross-section A on the plans. Rock size is approximately 2-4' diameter. An additional 30 linear feet of similarly sized rip-rap forms a bulkhead at the end of the peninsula that forms the southern bank of Coal Creek. This peninsula was subject of an enforcement action between the property owner and the City.

***14. Why isn't the applicant proposing to monitor the new channel and log structures to ensure that they are fish passable? How will we know if this project is fish passable if there is no monitoring?***

It is known that returning adult salmonids have a difficult time navigating through the alluvial fan when the Corps lowers the lake in the fall. Tours can be provided this fall if you would like to witness this situation. This project is largely intended to aid migration of upstream adults as well as downstream migrants. The project is not responsible for eliminating a problem that already exists.

***15. Why didn't the applicant review and use information from the DEIS (2005) and FEIS (2006) for the Coal Creek Sedimentation Program for current information about fish habitat and salmonid use in Coal Creek?***

There are many studies about Coal Creek and its fish use. It is known that the alluvial fan creates a partial barrier to upstream migration, particularly in the fall when the Corps lowers

the lake level. Downstream migrants, as well, become easy prey. This is a common problem to all of the small creeks that drain into Lake Washington due to the non-natural hydrograph and we believe a partial remedy is in the offing. If a fish barrier doesn't present itself at a certain point in time, then this project still provides habitat for salmonids by introducing abundant LWD in an alluvial fan where it would have existed in pre-historic times. The proposal supports the findings of the Coal Creek Sedimentation Program.

**16. *The culvert under Skagit Key road appears to be undersized and likely interferes with the passage of wood, water, sediment and perhaps prevents fish passage. Does the City have any data or information regarding the success of this culvert to pass the resources listed above?***

**City data on the culvert's performance for:**

**Woody Debris** -- the Skagit Key culvert is the downstream most culvert in the entire watershed. The Newport Shores reach of Coal Creek is downstream of a regional pond where most woody debris from the upper forested watershed is caught. In the event that significant woody debris enters the system downstream of the regional pond, three other culverts in the neighborhood are upstream of the Skagit Key culvert. According to City of Bellevue Storm and Surface Water maintenance crews, the culverts in Newport Shores are routinely inspected, including the Skagit Key culvert and they have rarely had to remove debris.

**Sediment** -- the Coal Creek delta immediately downstream of Skagit Key culvert receives on average 1500CY of sediment per year. Sediment transport through the culvert is documented by the delta growth.

**Flow** -- the Skagit Key culvert is sized sufficiently to pass the 100-year flow event

**Fish** -- the Skagit Key culvert is not listed among the fish passage barrier culverts in the city. In the absence of flow quantile barrier analysis, flow depths and velocities appear to meet state standards for fish passage.

**17. *Does this culvert contribute to flooding at 73 and 75 Skagit Key?***

*The Skagit Key culvert does not contribute to flooding at 73 or 75 Skagit Key because those properties are located downstream of the culvert.*

**VII. Changes to Proposal as a Result of Staff Review**

1. The footbridge was modified so that its footings were pulled out of the Spearman Base Flood Elevation of 22 NADV88 Datum.

**VIII. Applicable Decision Criteria**

The proposal, as conditioned below, meets the applicable clearing and grading regulations listed in the Shoreline Overlay District contained in Land Use Code Section 20.25E.080.G.

1. **All clearing, grading, excavating, and fill in the Shoreline Overlay District shall comply with the provisions of BCC 23.10.140.**

**Finding:** The proposal meets the erosion control standards of BCC 23.76.080 (updating the former BCC 23.10.140) to mitigate impacts of erosion on site during construction. All proposed clearing and grading associated with this site will be reviewed and approved under clear and grade permit number 06-115929-GH currently under review.

2. **No clearing, grading, excavating, or fill shall be allowed within 25 feet of the ordinary high water mark except as permitted by this Part 20.25E.**

3. **Wherever the City determines that the act or intended act of clearing, grading, excavation or fill has become or will constitute a hazard In life or limb, or endangers property, or adversely affects the safety, use of, or stability of a public way, drainage channel or natural watercourse, including siltation and sedimentation therein, the owner of the property upon which the clearing, excavation or fill is located or the other person or agent in the City shall, within the period specified therein terminate such clearing, grading, excavation, embankment or fill, or eliminate the same from the development plan, or modify the plans, as may be required so as to eliminate the hazard and be in conformance with the requirements of this Code.**

**Finding:** The proposal meets the erosion control standards of BCC 23.76.080 (updating the former BCC 23.10.140) to mitigate impacts of erosion on site during construction. All proposed clearing and grading associated with this site will be reviewed and approved under clear and grade permit number 06-115929-GH currently under review.

The proposal, as conditioned below, meets the applicable Shoreline Protection Regulations in the Shoreline Overlay District contained in Land Use Code Section 20.25E.080.S.

1. **New development in the Shoreline Overlay District shall utilize design and construction methods and practices which will protect such development from damage resulting from a 100-year flood.**

**Finding:** A flood berm will be constructed using multiple layers of coir-wrapped (lifts) topsoil utilizing best management practices. Each lift will be a maximum of 1-foot high with the face and top of the flood control berm staked with 420 live willows. The floodplain will not be confined and the berm will be used to protect the existing residence and deck structure. The proposed berm will be no more than 3 ft. high as measured from elevation 18.8 NAVD 88 Datum(Ordinary High Water).

- 2. New development within the Shoreline Overlay District shall provide for the routing of flood waters and shall avoid reducing the flood water storage capacity of the wetlands and marshes, bogs and swamps.**

**Finding:** A fairly active floodplain occurs along the north side of the stream approaching the mouth of Coal Creek consisting of the upper part of the delta. The width/depth dimensions of the Coal Creek Channel on and in the vicinity of the project site appear to be at risk with respect to carrying the flows experienced by the creek. However, the fairly broad, active floodplain area of the north of the stream and through the project reach tends to moderate the potential impacts of these flows. As a result, the physical form of the channel just upstream will not reduce the capacity of the associated floodplain and wetland.

- 3. Riprapping and bank stabilization measures should be of a sloping design, meeting the criteria set forth in City of Bellevue clearing and grading regulations, Chapter 23.76 BCC, and should be left ungrouted.**

**Finding:** The proposal meets the standards of BCC 23.76 for slope design and bank stabilization. Proposed placement of V-logs, Bank logs, reventment logs, fallen trees and rootwads meet all applicable clearing and grading standards pursuant to Chapter 23.76 BCC.

- 4. Development within the Shoreline Overlay District shall exclude those uses which reduce the floodway area to the extent that they either cause a backwater on upstream property or increase the velocity on downstream property.**

**Finding:** The proposed restoration will improve the floodway area and restore the mouth of Coal Creek and provide habitat. The work is intended to reduce the potential for backwater and to moderate velocities.

The proposal, as conditioned below, meets the applicable Shoreline Substantial Development Permit regulations listed in Land Use Code Section 20.30R.155.

- 1. The applicant has carried the burden of proof and produced evidence sufficient to support the conclusion that the application merits approval or approval with modifications; and**

**Finding:** This approval is based on the following information submitted to the City as part of the application:

Environmental Checklist	The Watershed Way 6/2/06
Geotechnical Report	Earth Solutions, 10/28/05
Biological Assessment	The Watershed Company, 3/21/06
Wetland Delineation	The Watershed Company, 10/13/05
Turbidity Monitoring Plan	The Watershed Company, 9/22/06
Hydraulic Assessment	Watershed Company, 9/5/06
Survey	The Watershed Company, 5/1/06

Site Plan Creative Comforts, 4/27/06  
Architectural & Civil Drawing Creative Comforts, 4/27/06

**2. The applicant has demonstrated that the proposal complies with the applicable decision criteria of the Bellevue City Code; and**

**Finding:** The project, as described in Section III and IV and conditioned in Section X of this report, meets the decision requirements of LUC Sections 20.25E.H, 20.25E.Q,(Shoreline regulations for Residential Development) 20.25E.S, (Shoreline Protection Regulations) 20.25.G, (Clearing and Grading Regulations) 20.25I (Dredging Regulations) 20.30R (Shoreline Substantial Development) and all other applicable codes and restrictions.

**3. The applicant has demonstrated that the proposal is consistent with the policies and procedures of the Shoreline Management Act and the provisions of Chapter 173-14 WAC and the Master Program.**

**Finding:** The project is consistent with the City of Bellevue Shoreline Master Program Policies with the City of Bellevue's Comprehensive Plan.

SH-3: Give priority to uses and activities which improve or are compatible with the natural amenities of the shorelines, provide public access, or depend on a shoreline location.

SH-8: Discourage uses, activities, and development in the shoreline area that create offensive, unsafe, or unmitigated adverse impacts.

SH-13: Protect and improve wildlife and aquatic habitats, particularly spawning waters:

The proposal as designed and conditioned improves the existing condition of the shoreline area and the mouth portion of Coal Creek which are highly valued aquatic waters and salmon spawning waters. All work within the shoreline, riparian corridor and associated wetland have been conditioned as to mitigate impacts as to be considered non significant. The proposed enhancement will be done using log weirs, revetment logs and root wads to create an area compatible with the shoreline and riparian corridor.

The project is consistent with the review criteria of WAC 173-27-140 for all development within the shoreline, as well as the specific review criteria for shoreline substantial development permits pursuant to WAC 173-27-150 and the submittal requirements pursuant to WAC 173-27-180. The provisions of Chapter 173-27 WAC and the Master Program updated the permit and enforcement procedures of WAC 173-14.

**IX. Decision of the Director**

After conducting the various administrative reviews associated with this proposal, including

applicable Land Use consistency, SEPA, and City Code and Standard compliance reviews, the Director of Planning and Community Development does hereby APPROVE WITH CONDITIONS the subject proposal for a Shoreline Substantial Development Permit.

## **X. Conditions of Approval**

### **COMPLIANCE WITH BELLEVUE CITY CODES AND ORDINANCES**

The applicant shall comply with all applicable Bellevue City Codes and Ordinances including but not limited to;

#### **Applicable Ordinances**

Clearing & Grading Code – BCC 23.76  
Land Use Code – BCC Title 20  
Noise Control – BCC 9.18  
Sign Code – BCC Title 22  
Utility Code – BCC Title 24

#### **Contact Person**

Savina Uzunow, 425-452-7860  
Leah Hyatt, 425-452-6834  
Leah Hyatt, 425-452-6834  
Leah Hyatt, 425-452-6834  
Robert Hutchinson, 425-452-7903

#### **The following conditions are imposed under authority referenced:**

- 1. In Water Construction Window:** To mitigate the adverse impacts to the fisheries resources, in-water construction shall occur during the July 16<sup>th</sup> through July 31<sup>st</sup> and November 16<sup>th</sup> and December 31<sup>st</sup> periods. These work windows apply unless otherwise determined by the Hydraulics Project Approval issued by the Washington State Department of Fish and Wildlife.

**Authority:** SEPA - (Comprehensive Plan Policy EN-24, EN-26 and Shoreline Master Program Policies SH-13)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 2. Federal and State Permits:** Federal and state water quality standards shall be met. All required federal and state permits and approvals must be received by the applicant prior to commencement of any work. A copy of the Section 404 permit issued by the Army Corps of Engineers (if required) and the Hydraulic Project Approval (HPA) issued by the Washington State Department of Fish and Wildlife shall be submitted to the City of Bellevue, prior to calling for a preconstruction inspection. Any alterations resulting from state or federal agency review must be submitted as a revision to this permit, prior to commencement of work.

**Authority:** Bellevue City Code 20.25E.080, Bellevue City Code 23.76

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 3. Field Location of Utilities:** To mitigate potential water quality degradation if a sewer line were broken during construction, utilities shall be field located prior to construction activities. The appropriate jurisdictions and departments shall be contacted at 1-800-

424-5555. No boats or barges may be located on top of sewer main. If there are any field issues regarding the sewer main, contact COB Wastewater Operations 24 hrs (425) 452-7840.

**Authority: Shoreline Substantial Development Permit:** (Comprehensive Plan Policies EN-13 and EN-14)

**Reviewer:** Robert Hutchinson, Utilities Division, Planning & Community Development

4. **Silt Curtain:** To mitigate adverse impacts to water quality from the migration or lateral spreading of re-suspended sediments, a silt curtain shall be placed around all in stream work areas. All materials used in the temporary containment shall be non-toxic. At project completion, the silt curtain shall be removed in such a manner to minimize sediment disturbance. Silt curtain details and location shall be shown on the site plan prior to issuance of the Building Permit.

**Authority: Shoreline Substantial Development Permit:** (Comprehensive Plan Policies EN-11, EN-40, EN-41), Shoreline Master Program Policy SH-13, BCC 23.76.090)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

5. **Bridge Free Board Height:** The footbridge shall be designed so as to ensure a minimum of 1 foot of free board above base flood elevation of 22 feet to ensure that the bridge will pass high stream flows and not wash out.

**Authority:** LUC Section 20.25H.110.A.6.

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

6. **Erosion Control:** To mitigate the adverse impacts to the resources implementation of all conservation measures as required by the Biological Evaluation.

1. In-water construction shall be performed from a stationary barge or workboat and shall occur from July 16 through July 31 and November 16 through December 31.
2. Erosion control and spill prevention measures shall be in place prior to commencement of construction and shall be maintained throughout the entire construction period.
3. To prevent siltation, stream flows shall be routed around certain project areas during construction depending on the type and extent of work. Fish would be captured and safely removed as necessary from those localized project areas where in stream work is required.
4. Prior to commencement of excavation, a sedimentation control curtain shall be installed around the work area.
5. All construction debris shall be properly disposed of on land in such a manner that can not enter into the waterway or cause water quality degradation.
6. Erosion and sediment control measures shall be implemented as appropriate during and following installation of the proposed plantings, including measures for both the short term and permanent stabilization of exposed soils, and as silt

fence or erosion control mulch.

7. As necessary, where intensive in-stream work is required due to log structure placement, localized areas will be isolated during construction, and juvenile fish will be captured and relocated out of harm's way.
8. All exposed side slope and top-of-slope soils will be stabilized by hydroseeding or by sowing approved grass seed mixture and mulching with straw, leaf mold, chipped yard waste, or other approved mulching material.

**Authority:** SEPA (Comprehensive Plan Policy EN-11, EN-10 EN-14), Bellevue City Code 23.76

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

7. **Fish Relocation:** As necessary, where intensive in stream work is required due to log structure placement, localized areas will be isolated during construction, and juvenile fish will be captured and relocated out of harm's way. The bypass system must be in operation prior to commencing grading and clearing on the site. A pump should be provided to ensure diverted stream flow moves through the pipe. A backup pump is also required in case the primary pump fails. A temporary barrier structure or device should be installed downstream of the construction site design to trap residential sediments after construction is complete and before full is restored.

**Authority:** SEPA (Comprehensive Plan Policy EN-62, EN-63)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

8. **Rainy Season restrictions:** Due to the Type A riparian corridor, associated wetland and proximity to the shoreline corridor, this site is subject to rainy season restrictions. Although in-water construction is allowed for this site between November 16<sup>th</sup> and December 31<sup>st</sup> it is not recommended. No clearing and grading activity may occur during the rainy season, which is defined as November 1 through April 30 without written authorization of the Department of Planning and Community Development. Should approval be granted to work during the rainy season, increased erosion and sedimentation measures, representing the best available technology must be implemented prior to beginning or resuming site work.

**Authority:** Bellevue City Code 23.76.093.A, SEPA

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

9. **Noise Control:** The proposal will be subject to normal construction hours of 7am to 6 pm Monday through Saturday except for Federal holidays and as further defined by the Bellevue City Code. Upon written request to PCD, work hours may be extended to 10 pm if the criteria for extension of work hours as stated in BCC 9.18 can be met.

**Authority:** Bellevue City Code 9.18

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 10. Riparian Corridor Restoration:** A flood berm shall be constructed using multiple layers of coir-wrapped (lifts) topsoil utilizing best management practices. Each lift shall be a maximum of 1-foot high with the face and top of the flood control berm staked with 420 live willows. Prior to the issuance of required grading permit, a restoration plan for the stream bank and the new berm shall be submitted and approved by the City of Bellevue.

**Authority:** SEPA ,(Comprehensive Plan Policy EN-11, EN-20, EN-26),  
LUC 20.25H.070.C

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 11. Wetland Buffer Restoration:** Impacts to the wetland buffer shall be mitigated through enhancing setback with native plantings and open water pond as required by prior PADE approval. An enhancement plan prepared by a wetland biologist shall be approved by the City prior to issuing any building permits.

**Authority:** SEPA (Comprehensive Plan Policies EN-12, EN-14,EN-15),  
PADE 00-255618-LO

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 12. Base Flood Elevation:** The cumulative effect of the proposed development adjacent to and within the floodplain shall not increase the water surface elevation of the base flood elevation of 18.8 NAVD 88 Datum.

**Authority:** SEPA (Comprehensive Plan Policy EN 40)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 13. Construction Window Out of Water Work :** Since the project site is located within an eagle foraging area, out of water construction at the mouth of Coal Creek is not permitted between October 31 through March 31.

**Authority:** SEPA

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 14. Stream Enhancement Monitoring Requirement :** A monitoring plan is required to be submitted prior to the issuance of any clear and grade permit. The monitoring plan shall specify the preferred methods and standards by which the long term performance of the structures are assessed are to be monitored. The restoration work is required to be monitored for a period of 3 years.

**Authority:** SEPA (Comprehensive Plan Policy EN-14)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

**Attachments**

- A MDNS Form**
- B Environmental Checklist**
- C Shoreline Substantial Development Permit**
- D Memo**
- E Draft Biological Assessment**
- F Joint Aquatics Permit Application**
- G Wetland Delineation and Stream Location Survey**
- H GeoTechnical Report**
- I Turbidity Monitoring Plan**
- J Hydraulic Assessment**
- K Plans**
- L Plans**



DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT  
ENVIRONMENTAL COORDINATOR  
P.O. BOX 90012  
BELLEVUE, WA 98009-9012

## MITIGATED DETERMINATION OF NON-SIGNIFICANCE

**PROPONENT:** William Weinstein

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### NAME & DESCRIPTION OF PROPOSAL:

The applicant is proposing to restore and enhance portions of Coal Creek as it passes between 73 and 75 Skagit Key.

The following elements are included as part of the proposal:

1. Riparian Corridor Restoration: Sedimentation impacts in the project reach have raised the elevation of the streambed, causing a section of the bank on the south side of the stream to be overtopped during flood events. A new flood control berm is proposed that will replace existing sandbags left in place. The berm will be constructed as multiple layers of coir wrapped topsoil. Each lift will be a maximum of 1' in height. The face and top of each berm will be staked with a total of 420 live willows.
2. Enhanced Salmon Channel: Sedimentation impacts have resulted in an extensive delta of sand and gravel extending approximately 270 feet beyond the mouth of Coal Creek into Lake Washington. During low-lake conditions (fall through spring), Coal Creek creates a number of small meandering channels through the delta or sheet flows across the delta. The proposal would provide a number of in-stream log habitat structures throughout the project reach, and install a series of log weirs extending out into the delta such that Coal Creek flows would be directed through and over them, creating a fish passable primary channel. Four V-logs, 16 fallen trees and 26 revetment logs and rootwads shall be placed within the channel. The proposed V-logs will be either Douglas Fir or Western Red Cedar logs with rootwads attached in 16' long and minimum 12" diameter at tip. Each pair of V-logs are to be attached to three anchors. The proposed revetment logs will either be Douglas Fir or Western Red Cedar a minimum of 16' long and a minimum 12" in diameter at the tip. Two of every three revetment logs shall have rootwad intact and each one shall be attached with one anchor. The proposed fallen trees shall be either Douglas Fir or Western Red Cedar a minimum of 16' in length and 12" in diameter. Anchors shall consist of manta ray earth anchors or the equivalent. Anchors will be driven a minimum 4' into the ground at an angle approximately 30 degrees from vertical aimed away from the center of the channel and upstream. All anchors are to be load tested to a minimum of 12,000 pounds which is sufficient force to anchor logs entirely submerged in a flow of 10' per second. As needed, pools would be excavated in the channel so that logs would provide functional habitat at low flows. Also included in the proposal are placed log complexes which are intended to provide the scour needed to maintain the pools around them over time.
3. Footbridge: The applicant proposes to build a footbridge across Coal Creek between 73 and 75 Skagit Key; it is the applicant's intention to have two homes on separate lots connected by a footbridge and trail.

**FILE NUMBER:** 06-115928-WG

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# Attachment B

City of Bellevue Submittal Requirements

27

## ENVIRONMENTAL CHECKLIST

12/21/00

*Thank you in advance for your cooperation and adherence to these procedures. If you need assistance in completing the checklist or have any questions regarding the environmental review process, please visit or call the Permit Center (425-452-6864) between 8 a.m. and 4 p.m., Monday through Friday (Wednesday, 10 to 4). Our TTY number is 425-452-4636.*

### INTRODUCTION

#### Purpose of the Checklist:

The State Environmental Policy Act (SEPA), chapter 43.21c RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the City of Bellevue identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the City decide whether an EIS is required.

#### Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Answer the questions briefly, with the most precise information known, or give the best description you can. You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the Planner in the Permit Center can assist you. The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. Include references to any reports or studies that you are aware of which are relevant to the answers you provide. The City may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impacts.

**Use of a Checklist for Nonproject Proposals:** *A nonproject proposal includes plans, policies, and programs where actions are different or broader than a single site-specific proposal.*

For nonproject proposals, complete the Environmental Checklist even though you may answer "does not apply" to most questions. In addition, complete the Supplemental Sheet for Nonproject Actions available from Permit Processing.

For nonproject actions, the references in the checklist to the words *project*, *applicant*, and *property* or *site* should be read as *proposal*, *proposer*, and *affected geographic area*, respectively.

**Attach an 8½" x 11" vicinity map which accurately locates the proposed site.**

**RECEIVED**

Cityart  
06-115907-667  
11/21/06

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Permit Processing

passes between 73 and 75 Skagit Key (the applicant currently resides at 73 Skagit Key).

- 1) **Flood Control Berm:** Sedimentation impacts in the project reach have raised the elevation of the streambed, causing a section of the bank on the south side of the stream to be overtopped during flood events. During a large flood event several years ago, the Bellevue Fire Department constructed a sand bag berm in the overtopped area. This proposal would replace the sandbag berm with coir-wrapped topsoil lifts, staked with willows.
- 2) **Enhanced Salmon Channel:** Sedimentation impacts have also resulted in an extensive delta of sand and gravels extending at least 270 feet beyond the mouth of Coal Creek into Lake Washington. During low-lake conditions (fall through spring), Coal Creek creates a number of small, meandering channels through the delta or sheet flows across the delta. Passage of adult salmon through the delta and into Coal Creek is at least partially blocked as a result. This proposal would provide a number of in-stream log habitat structures throughout the project reach, and install a series of log structures in a herringbone pattern extending out onto the delta such that Coal Creek flows would be directed through them, creating a fish-passable primary channel. As needed, pools would be excavated in the channel (~35 cy of excavation) so that logs would provide functional habitat at low flows. Placed log complexes are expected to provide the scour needed to maintain pools around them over time.
2. Acreage of site: 75 Skagit Key (the primary parcel) is 0.65 acre; 73 Skagit Key is 0.76 acre.
3. Number of dwelling units/buildings to be demolished: None
4. Number of dwelling units/buildings to be constructed: One
5. Square footage of buildings to be demolished: 0
6. Square footage of buildings to be constructed: 3,277.04 ft<sup>2</sup>
7. Quantity of earth movement (in cubic yards): approximately 548 cubic yards total cut and 186 cy total fill (house, stream enhancements and pond)
8. Proposed land use: The project area will include one single-family residence, as well as a wetland, stream, and wetland/stream buffer.
9. Design features, including building height, number of stories, and proposed exterior materials: The proposed residence is 31 feet, 3.625 inches tall. The house will be sided with cedar shake and roofed with slate tiles.
10. Other

Estimated date of completion of the proposal or timing of phasing:

The residence and associated structures would likely take one year to complete, and would begin as soon as all permits have been obtained.

In-water portions of the project will likely take two weeks to construct, commencing as soon as all permits have been obtained, but outside the limits of fish-protection timing restrictions (work between 16 July through 31 July and 16 November through 31 December).

Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

Shoreline Management Permit  
Site plan

Clean fill material would be obtained from local suppliers.

- f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Upland erosion could occur if exposed soils are mobilized by rainfall. Short-term erosion may occur along the streambanks during habitat log placement or re-construction of the flood control berm. The measures described below would help minimize upland erosion. Potential streambank erosion is discussed under 3 Water d.

- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

The proposed project will add close to 4,000 SF of impervious surfaces – 3,277 for the residence, 528 for the driveway, and 193 for the paths and bridge. This is equivalent to the 10 percent of the site calculated using the latest measurement of site area above the lake's ordinary high water mark located by Triad. The driveway and paths will be constructed of pavers with gaps to allow for infiltration so that it would not effectively function as impervious surface.

- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

All clearing and grading construction would be in accordance with City of Bellevue Clearing & Grading Code, Clearing & Grading Erosion Control Standard Details (EC-1 through EC-23), Development Standards, Land Use Code, permit conditions, and all other applicable codes, ordinances, and standards. All material would be stockpiled on site above the OHWM and outside of the wetland.

The proposed residence utilizes one of the recommendations made by the geotechnical engineer to address the foundation soils.

*Erosion mitigated by application of BCC 23.76.*

## 2. AIR

- a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Any air quality impacts from construction vehicle emissions and dust generation would be temporary and rapidly dissipated. After project completion, no further impacts to air would occur.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

There are no off-site sources of emissions that will affect the project.

- c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Standard methods of reducing impacts to air would be utilized, and include keeping all heavy equipment in good operating condition and managing disturbed soils as described above under 1h.

**There will be no waste material from septic tanks or other sources discharged into the ground as part of this project.**

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

**Runoff from project impervious surfaces will be directed into the proposed pond, supplying it with the necessary hydrology. Impervious surfaces are almost entirely rooftop, all other solid surfaces will be pavers with gaps between to allow infiltration. The downslope lip of the pond is at the grade of the wetland buffer, enabling any overflow water to leak onto essentially level ground, then drain west into the wetland and ultimately into Lake Washington. No appreciable slopes occur between the pond elevation and any overflow waters heading toward Lake Washington.**

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

**During construction, fuel, lubricant or other material spills from equipment could enter surface waters.**

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

**The erosion control measures described under question 1h would help control impacts to surface and runoff water. Hydraulic Project Approvals (HPAs) issued by Washington Department of Fish and Wildlife (WDFW) direct the contractor to take extreme care for the duration of the project to "ensure that no petroleum products, hydraulic fluid, fresh cement, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into the lake." In addition, equipment would be in good working order with no known leaks.**

**Further, the in-stream work would comply with the following measures:**

- a) **In-water construction activity would only occur from 16 July through 31 July for protection of fish and wildlife.**
- b) **Erosion control and spill-prevention measures would be in place prior to commencement of construction, and would be maintained throughout the construction period.**
- c) **To prevent siltation, stream flows would be routed around certain project areas during construction, depending on the type and extent of work involved. Fish would be captured and safely removed as necessary from those localized project areas where in-stream work is required.**
- d) **Prior to commencement of excavation, a sedimentation control curtain would be installed around the work area.**
- e) **In-lake construction shall be performed from a barge or workboat.**
- f) **All construction debris shall be properly disposed of on land in such a manner that it cannot enter into the waterway or cause water quality degradation (Section 13, Rivers and Harbors Act).**
- g) **Erosion and sediment control measures would be implemented as appropriate during and following installation of the proposed plantings, including measures for both the short-term and permanent stabilization of exposed soils, such as silt fence or erosion-control mulch.**

The nearest nesting bald eagle pair is located more than 1.0 mile from the site. Bald eagles commonly forage in Lake Washington, particularly at the mouths of salmon-bearing streams such as Coal Creek.

- c. Is the site part of a migration route? If so, explain.

As described above, adult and juvenile salmon migrate up and downstream, respectively, through Lake Washington and Coal Creek. Migrating waterfowl may use the lake as resting and foraging areas during spring and fall migrations.

- d. Proposed measures to preserve or enhance wildlife, if any:

The proposed project includes several features that will enhance wildlife habitat: 1) stream enhancement work will add habitat complexity and improve fish passage conditions into Coal Creek; 2) construction of a pond will provide amphibian breeding habitat; and 3) after project implementation, the entire site (other than areas occupied by structures or driveway) will be vegetated with native species. A split-rail fence will limit human intrusion into buffers. In-water work will occur within the construction window established by state and federal agencies to minimize or avoid impacts to fish and wildlife.

## 6. ENERGY AND NATURAL RESOURCES

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The proposed residence will utilize electricity and natural gas for typical uses such as heating, lighting, powering electronic devices and household appliances, etc.

- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

- c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

No measures are proposed.

## 7. ENVIRONMENTAL HEALTH

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Typical hazards related to heavy equipment fuels are associated with construction of the proposed project.

- 1) Describe special emergency services that might be required.

Emergency services are not anticipated at the site. In the unlikely event that an accident (spill, fire, other exposure) occurs involving toxic chemicals or hazardous wastes, the local Fire Department's Hazardous Materials Team would respond. If necessary, local medical services might also be required. The full range of safety and accident response supplies would be on-site to treat any emergency.

f. What is the current comprehensive plan designation of the site?

**SF-M (Single-family medium).**

g. If applicable, what is the current shoreline master program designation of the site?

**Residential.**

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

**Lake Washington is a shoreline of the state. Coal Creek is a Type A riparian corridor, and the wetland associated with Lake Washington/Coal Creek is a Type A wetland.**

i. Approximately how many people would reside or work in the completed project?

**The family of the applicant will reside in the proposed residence.**

j. Approximately how many people would the completed project displace?

**No person will be displaced as a result of this project.**

k. Proposed measures to avoid or reduce displacement impacts, if any:

**Does not apply.**

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

**The residence is proposed in a single-family residential neighborhood zoned R-2.5. The City's future land use map does not indicate a different use for the area.**

## 9. HOUSING

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

**The project includes one single-family residence that would fall into the high-income category.**

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

**None**

c. Proposed measures to reduce or control housing impacts, if any:

**Does not apply**

## 10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

**The tallest portion of the residence is 31 feet, 3.625 inches tall. The home will be sided with cedar shake and roofed with slate tiles.**

- b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

**There are no landmarks or evidence of such in the immediate vicinity.**

- c. Proposed measures to reduce or control impacts, if any:

**Should historic, archeological, scientific or cultural significant items be encountered during implementation of this project, work would be temporarily stopped while the appropriate agencies are notified.**

#### 14. TRANSPORTATION

- a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

**The proposed residence will have a driveway off of Skagit Key, with easy access to and from Interstate 405 via Coal Creek Parkway/Lake Washington Boulevard SE.**

- b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

**The nearest King County Metro transit stop is 0.7 mile southeast at the intersection of I-405 and Coal Creek Parkway SE.**

- c. How many parking spaces would the completed project have? How many would the project eliminate?

**The project will create 2 off-road parking spaces (driveway) and 2 garage parking spaces to accommodate the applicant and his family's vehicles.**

- d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

**This project will not affect public roads in any way.**

- e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

**A portion of the lake enhancement work will be conducted from a barge.**

- f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

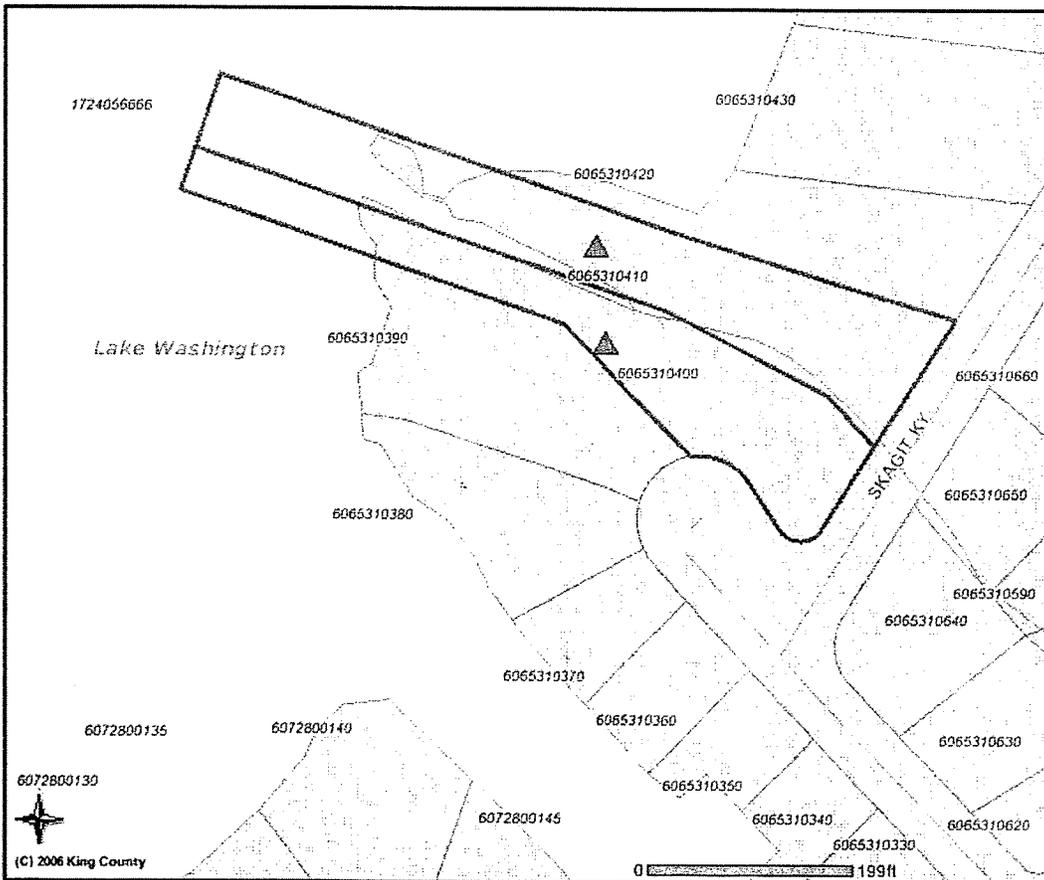
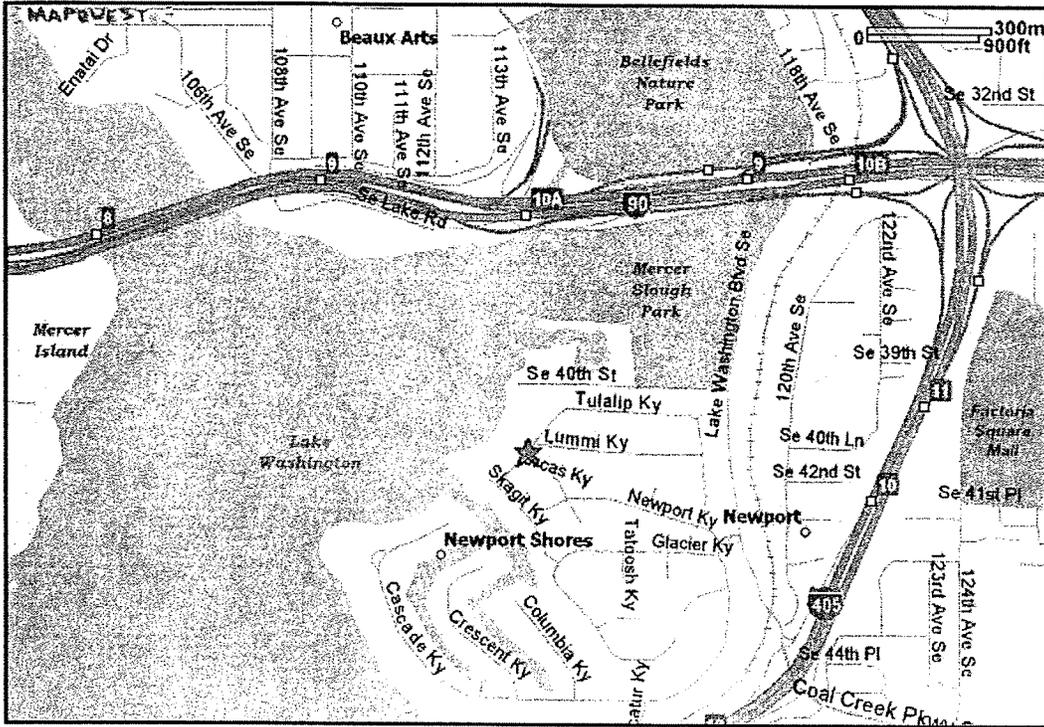
**The number of trips generated per day would be typical of most families.**

- g. Proposed measures to reduce or control transportation impacts, if any:

**None.**

A handwritten signature in black ink, appearing to be 'JH' or similar, located in the bottom right corner of the page.

**Vicinity Map** from MapQuest (top) and King County iMAP (bottom)





# Attachment C

City of Bellevue  
Department of Planning & Community Development  
P.O. Box 90012, Bellevue, WA 98009-9012  
(425) 452-6864 Fax (425) 452-5225

## Shoreline Management Act of 1971 Permit for Shoreline Management Substantial Development Conditional Use and/or Variance

Application No. 06-115928 WB

Date Received 6/2/06

Approved / Date 11/30/06

Denied / Date \_\_\_\_\_

Type of Action:

- Substantial Development Permit
- Conditional Use Permit
- Variance Permit

Pursuant to Chapter 90.58 RCW, a permit is hereby granted/denied to: **Bruce Gibson**

to undertake the following development:

Installation of a 392 square foot fixed pile pier including boat lift with attached canopy on Lake Washington. Includes shoreline planting plan and landscaping..

upon the following property: 73 & 75 Skagit Key

within Lake Washington  
and/or its associated wetlands. The project will be located \_\_\_\_\_ within Shorelines of Statewide Significance (RCW 90.58.030). The project will be located within a Shoreline Overlay District designation. The following master program provisions are applicable to this development:

- Land Use Code(LUC) Section 20.25E.080(B)General Regulations Applicable to all Land Use Districts & Activities:
- Bellevue Comprehensive Plan, Shoreline Management Program Element, Policy SH-37

Development pursuant to this permit shall be undertaken in accordance with the following terms and conditions:

1. **In Water Construction Window:** To mitigate the adverse impacts to the fisheries resources, in-water construction shall occur during the July 16<sup>th</sup> through July 31<sup>st</sup> and November 16<sup>th</sup> and December 31<sup>st</sup> periods. These work windows apply unless otherwise determined by the Hydraulics Project Approval issued by the Washington State Department of Fish and Wildlife.

**Authority: SEPA** - (Comprehensive Plan Policy EN-24, EN-26 and Shoreline Master Program Policies SH-13)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

2. **Federal and State Permits:** Federal and state water quality standards shall be met. All required federal and state permits and approvals must be received by the applicant prior to commencement of any work. A copy of the Section 10 permit issued by the Army Corps of Engineers (if required) and the Hydraulic Project Approval (HPA) issued by the Washington State Department of Fish and Wildlife shall be submitted to the City of Bellevue, prior to calling for a preconstruction inspection. Any alterations resulting from state or federal agency review must be submitted as a revision to this permit, prior to commencement of work.

**Authority:** Bellevue City Code 20.25E.080, Bellevue City Code 23.76

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

3. **Field Location of Utilities:** To mitigate potential water quality degradation if a sewer line were broken during construction, utilities shall be field located prior to construction activities. The appropriate jurisdictions and departments shall be contacted at 1-800-424-5555. No boats or barges may be located on top of sewer main. If there are any field issues regarding the sewer main, contact COB Wastewater Operations 24 hrs (425) 452-7840.

**Authority: Shoreline Substantial Development Permit:** (Comprehensive Plan Policies EN-13 and EN-14)

**Reviewer:** Robert Hutchinson, Utilities Division, Planning & Community Development

4. **Silt Curtain:** To mitigate adverse impacts to water quality from the migration or lateral spreading of re-suspended sediments, a silt curtain shall be placed around all in stream work areas. All materials used in the temporary containment shall be non-toxic. At project completion, the silt curtain shall be removed in such a manner to minimize sediment disturbance. Silt curtain details and location shall be shown on the site plan prior to issuance of the Building Permit.

**Authority: Shoreline Substantial Development Permit:** (Comprehensive Plan Policies EN-11, EN-40, EN-41), Shoreline Master Program Policy SH-13, BCC 23.76.090)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

5. **Bridge Free Board Height:** The footbridge shall be designed so as to ensure a minimum of 1 foot of free board above base flood elevation of 22 feet to ensure that the bridge will pass high stream flows and not wash out.

**Authority:** LUC Section 20.25H.110.A.6.

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

6. **Erosion Control:** To mitigate the adverse impacts to the resources implementation of all conservation measures as required by the Biological Evaluation.

1. In-water construction shall be performed from a stationary barge or workboat and shall occur from July 16 through July 31 and November 16 through December 31.
2. Erosion control and spill prevention measures shall be in place prior to commencement of construction and shall be maintained throughout the entire construction period.
3. To prevent siltation, stream flows shall be routed around certain project areas during construction depending on the type and extent of work. Fish would be captured and safely removed as necessary from those localized project areas where in stream work is required.
4. Prior to commencement of excavation, a sedimentation control curtain shall be installed around the work area.
5. All construction debris shall be properly disposed of on land in such a manner that can not enter into the waterway or cause water quality degradation.
6. Erosion and sediment control measures shall be implemented as appropriate during and following installation of the proposed plantings, including measures for both the short term and permanent stabilization of exposed soils, and as silt fence or erosion control mulch.
7. As necessary, where intensive in-stream work is required due to log structure placement, localized areas will be isolated during construction, and juvenile fish will be captured and relocated out of harm's way.
8. All exposed sideslope and top-of-slope soils will be stabilized by hydroseeding or by sowing approved grass seed mixture and mulching with straw, leaf mold, chipped yard waste, or other approved mulching material.

**Authority:** SEPA (Comprehensive Plan Policy EN-11, EN-10 EN-14), Bellevue City Code 23.76

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 7. Fish Relocation:** As necessary, where intensive instream work is required due to logstructure placement, localized areas will be isolated during construction, and juvenile fish will be captured and relocated out of harm's way. The bypass system must be in operation prior to commencing grading and clearing on the site. A pump should be provided to ensure diverted stream flow moves through the pipe. A backup pump is also required in case the primary pump fails. A temporary barrier structure or device should be installed downstream of the construction site design to trap residential sediments after construction is complete and before full is restored.

**Authority:** SEPA (Comprehensive Plan Policy EN-62, EN-63)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 8. Rainy Season restrictions:** Due to the Type A riparian corridor, associated wetland and proximately to the shoreline corridor, this site is subject to rainy season restrictions. Although in-water construction is allowed for this site between November 16<sup>th</sup> and December 31<sup>st</sup> it is not recommended. No clearing and grading activity may occur during the rainy season, which is defined as November 1 through April 30 without written authorization of the Department of Planning and Community Development. Should approval be granted to work during the rainy season, increased erosion and sedimentation measures, representing the best available technology must be implemented prior to beginning or resuming site work.

**Authority:** Bellevue City Code 23.76.093.A, SEPA

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 9. Noise Control:** The proposal will be subject to normal construction hours of 7am to 6 pm Monday through Saturday except for Federal holidays and as further defined by the Bellevue City Code. Proximity to existing residential uses will be given special consideration. Upon written request to PCD, work hours may be extended to 10 pm if the criteria for extension of work hours as stated in BCC 9.18 can be met.

**Authority:** Bellevue City Code 9.18

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 10. Riparian Corridor Restoration:** A flood berm shall be constructed using multiple layers of coir-wrapped (lifts) topsoil utilizing best management practices. Each lift shall be a maximum of 1-foot high with the face and top of the flood control berm staked with 420 live willows. Prior to the issuance of required grading permit, a restoration plan for the stream bank and the new berm shall be submitted and approved by the City of Bellevue.

**Authority:** SEPA, (Comprehensive Plan Policy EN-11, EN-20, EN-26), LUC 20.25H.070.C

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

- 11. Wetland Buffer Restoration:** Impacts to the wetland buffer shall be mitigated through enhancing setback with native plantings and open water pond as required by prior PADE approval. An enhancement plan prepared by a wetland biologist shall be approved by the City prior to issuing any building permits.

**Authority:** SEPA (Comprehensive Plan Polices EN-12, EN-14, EN-15), PADE 00-255618-LO

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

12. **Base Flood Elevation:** The cumulative effect of the proposed development adjacent to and within the floodplain shall not increase the water surface elevation of the base flood elevation of 18.8 NAVD 88 Datum.

**Authority:** SEPA (Comprehensive Plan Policy EN 40)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

13. **Construction Window Out of Water Work :** Since the project site is located within an eagle foraging area, out of water construction at the mouth of Coal Creek is not permitted between October 31 through March 31.

**Authority:** SEPA

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

14. **Stream Enhancement Monitoring Requirement :** A monitoring plan is required to be submitted prior to the issuance of any clear and grade permit. The monitoring plan shall specify the preferred methods and standards by which the long term performance of the structures are assessed are to be monitored. The restoration work is required to be monitored for a period of 3 years.

**Authority:** SEPA (Comprehensive Plan Policy EN-14)

**Reviewer:** Leah Hyatt, Land Use Division, Planning & Community Development

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This permit is granted pursuant to the Shoreline Management Act of 1971 and nothing in this permit shall excuse the applicant from compliance with any other federal, state or local statutes, ordinances or regulations applicable to this project, but not inconsistent with the Shoreline Management Act (Chapter 90.58 RCW).

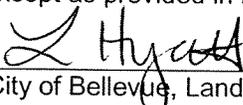
This permit may be rescinded pursuant to RCW 90.58.140(8) in the event the permittee fails to comply with the terms and conditions hereof.

Construction pursuant to this permit, or substantial progress toward construction, must be undertaken within two years of the date of final approval. This permit shall expire five years from the date of local approval.

Construction pursuant to this permit will not begin or is not authorized until twenty-one (21) days from the date of filing, as defined in RCW 90.58.140(6) and WAC 173-27-130, or until all review proceedings initiated within twenty-one (21) days from the date of such filing have terminated; except as provided in RCW 90.58.140(5) (A) (B) (C).

November 30, 2006

Date

  
\_\_\_\_\_  
City of Bellevue, Land Use Division

CC: Attorney General, Department of Ecology, Northwest Region  
Dept. of Fish and Wildlife, c/o Dept. of Ecology, 3190 160th Ave SE, Bellevue, WA 98008-5452 attn: Stewart Rienbold  
DOE, Betty Renkor, 3190 160<sup>th</sup> Avenue SE, Bellevue, WA 98008-5452

## Attachment D

# Memo

**To:** Michael Paine, City of Bellevue  
**From:** Mark Indrebo  
**CC:** Bill Weinstein  
**Date:** 5/23/2006  
**Re:** Lake Washington OHWM at 75 Skagit Key

---

Michael:

According to the Findings of Fact, Conclusion of Law and Decision dated June 25, 2002 (File Nos: AAD 02-59 & 00-255618LQ), excess sediment from Coal Creek has been depositing in the vicinity of the Weinstein property at 75 Skagit Key in Newport Shores, causing "significant accretion along the lake shore and significant aggradation of the stream channel." At that time, the accretion from Coal Creek had "moved the Ordinary High Water Mark (OHWM) farther into Lake Washington and...thus, increased the size of the subject property," resulting in a measurement of the property size, as measured from the OHWM at that time, of 38,355 square feet. Per the City's Land Use Code 20.30P.140 C, a Protected Area Development Exception (PADE) may be granted for a property of this size if the proposal results in no more than 10 percent of the site being disturbed by structure or other land alteration. Therefore, the development envelope or "bubble" referenced in the PADE was 3,835 square feet at that time.

In the intervening years, Coal Creek has continued to deliver sediment, and the property size has continued to increase. Because Mr. Weinstein is now in the process of developing a house plan for this property, he commissioned a survey to determine how much of the property is now above the OHWM. On April 6, 2005, surveyors from Triad delineated the OHWM at 75 Skagit Key. This OHWM was determined by comparing the ordinary high lake level in Lake Washington (18.6', NAVD88) to the elevations on the property. The results indicate that the area above the OHWM at 75 Skagit Key has grown to a total of 40,004 square feet, an increase of 4.3% over the 2002 measurement.

Based on this measurement of the OHWM, the development "bubble" allowable for the property, per LUC 20.30P.140, should be 4,000 square feet.

In your memo to Leah Porco (now Leah Hyatt) of your staff, dated March 31, 2006, you indicated that for this additional property above the OHWM to be included in calculations of the buildable area envelope, three criteria would need to be met, at a minimum. First, there must be continuous "upland"

Not all of the area landward of the OHWM is above 18.6' elevation. The survey shows that there is a depression near the north edge of the property. This depression is a closed depression, separated from the lake by a continuous strip of ground at or above 18.6' in elevation. Hugh Mortensen, our senior wetland biologist, and I both examined this depression on 20 April 2006. We were unable to discover any surface connection between the lake and the depression. Therefore, while the depression is vertically lower than the OHWM of the lake, it is laterally separated from the lake by higher ground, and therefore outside of or landward of the OHWM. This depression is not an unfilled channel, because it does not have a surface connection with the lake.

Based on the lake level data above, Triad's choice of 18.6' (NAVD) as the OHWM, and our field examination of the topography, we agree with Triad that all the area landward of their identified OHWM line is in fact continuously outside the OHWM, and remains outside the OHWM throughout the yearly fluctuations of the Lake. This satisfies the first and second criteria in your memo.

The survey flags hung during the OHWM survey were still in the field during our site visit, allowing us to accurately assess our location relative to the surveyed OHWM while examining the plant species. There appears to be no significant variation in plant species or density in the vicinity of the OHWM, though the plants are often in a slightly younger age class. Small trees and shrubs grow right up to the edge of the flagged OHWM. Given that the hydrology of the lake is timed such that peak levels occur in the summer rather than the winter, trees and shrubs would be even less likely to become established waterward of the OHWM here than on lakes with a more normal hydroperiod. Trees and shrubs are more tolerant of excess water during the winter dormant season than they are during the summer growing season. Hence while some species can grow waterward of the OHWM on a lake with a typical hydroperiod, it is rather unlikely that the trees and shrubs are waterward of the OHWM on Lake Washington. Since the vegetation does not change with respect to species or density, the third criteria of your memo is also met.

In summary, Triad defined the OHWM elevation at 18.6' (NAVD), which is 0.18' higher than the average high lake levels allowed by the Corps at the locks. The line surveyed by Triad depicts a continuous line around the property which effectively separates the lake from the adjoining non-lake or upland areas. Even areas that are vertically lower than the OHWM elevation are still separated from the lake by intervening higher ground. Finally, the vegetation nearest the OHWM has the same general plant assemblages and the same general density as the rest of the peninsula, though the plants near the edges may be younger. Given all this, we concur with methodology and conclusions reached by Triad concerning the area above the OHWM on the Weinstein property at 75 Skagit Key. We also believe that the survey meets the three criteria mentioned in your memo.

While the derivation of the three criteria in your memo is unclear, it does seem clear that the PADE reflects the LUC in limiting the development envelope to 10% of the subject property for properties over 30,000 square feet. Since a building plan is now being designed, and the property above the OHWM now measures 40,004 square feet, the development envelope on the property should be limited to 10% of the property area, or 4,000 square feet.

# Attachment E

## **DRAFT BIOLOGICAL EVALUATION**

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**for Sensitive Fish and Wildlife Species at the  
Proposed Coal Creek Stream Restoration Project,  
73 & 75 Skagit Key, City of Bellevue, WA: 2006**

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Prepared for:  
U.S. Army Corps of Engineers  
4735 East Marginal Way South  
Seattle, WA 98124-3755

Prepared on behalf of:

William Weinstein  
73 Skagit Key  
Bellevue, WA 98006

Prepared by:



**The Watershed Company**

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

21 March 2006

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**Appendix A: Stream Restoration Plans**

**Appendix B: Project Area Photos**

**Biological Evaluation**  
**Section 7, Endangered Species Act**

**Applicant: William Weinstein****Corps Reference #: 2006\_\_\_\_\_****1. Project Description**

The applicant is proposing to restore and enhance portions of Coal Creek (WRIA 08-0268) as it passes between the applicant's residential properties at 73 and 75 Skagit Key (Figure 1). The impetus for this project is derived from efforts to reduce sediment loading within the project reach of Coal Creek as a result of upstream actions. In 2004, the applicant reached a legal agreement with the City of Bellevue and King County regarding compensation of applicant expenses to 1) construct a flood-control berm on the south bank of Coal Creek (73 Skagit Key), and 2) "construct and maintain an environmentally beneficial salmon enhancement channel at the mouth of Coal Creek to assist in salmon passage across the Coal Creek delta" (United States District Court 2004).

- 1) Flood Control Berm: Sedimentation impacts in the project reach have raised the elevation of the streambed, causing a section of the bank on the south side of the stream to be overtopped during flood events. During a large flood event several years ago, the Bellevue Fire Department constructed a sand bag berm in the overtopped area. This proposal would replace the sandbag berm with coir-wrapped topsoil lifts, staked with willows.
- 2) Enhanced Salmon Channel: Sedimentation impacts have also resulted in an extensive delta of sand and gravel extending at least 270 feet beyond the mouth of Coal Creek into Lake Washington (Figure 2). During low-lake conditions (fall through spring), Coal Creek creates a number of small, meandering channels through the delta or sheet flows across the delta. Passage of adult salmon through the delta and into Coal Creek is at least partially blocked as a result. This proposal would provide a number of in-stream log habitat structures throughout the project reach, and install a series of log weirs extending out onto the delta such that Coal Creek flows would be directed through and over them, creating a fish-passable primary channel. As needed, pools would be excavated in the channel [~35 cubic yards (cy) of excavation] so that logs would provide functional habitat at low flows. Placed log complexes are expected to provide the scour needed to maintain pools around them over time.
3. Vegetation: The riparian buffer (upland and wetland) on 75 Skagit Key was enhanced with native trees and shrubs in 2001, and the final monitoring visit was conducted in October 2005. Planted vegetation included Douglas-fir, western red cedar, Sitka spruce, big-leaf maple, birch, ash, cottonwood, willows, vine maple, oceanspray, red-osier dogwood, twinberry, ninebark, red-flowering currant, rose, and salmonberry. The plantings exhibited 95% survival overall. Care will be taken to avoid disturbing mature and recently planted native vegetation along the corridor.

Note the extent of the Coal Creek delta.



Figure 2. Aerial photograph indicating project area (King County iMap, 2002).

Construction activities would occur in the following sequence:

- 1) Stake out property lines and approximate work-area limits.
- 2) Identify and protect all utilities that may exist in the construction area. Any damage to utilities, identified on plan or not, shall be the sole responsibility of the contractor.
- 3) Install all temporary erosion control measures, general and site-specific, as noted on the plans and supporting documents or as required by various permits and authorizations. In-stream work areas will be isolated by gravel-filled bags. A floating sedimentation curtain will be installed around the in-lake work areas.
- 4) At the discretion of the contractor, work may proceed along entire stream length at once, or in several segments sequentially, provided that all other criteria are met.
- 5) Place V-logs, bank logs, revetment logs, fallen trees, and rootwads as shown in plan and in the various details. It is generally preferred that anchors be placed and set prior to log placement in order to achieve desired setting pull. However, this can be altered at the discretion of the contractor and with the concurrence of the stream restoration specialist. Material installed beyond the reach (lakeward) of a small land-based excavator will be placed by a clamshell bucket mounted on a barge.

3. **Timing Restriction:** Once started, the proposed project is estimated to take approximately two weeks. Construction would begin as soon as permits and scheduling would allow, but in-water work would only occur from 16 July through 31 July and 16 November through 31 December, per the combined fish-protection policies of NOAA Fisheries, USFWS, and WDFW in Lake Washington. The proposed project is located approximately 0.4 mile from a WDFW-indexed sockeye salmon (*O. nerka*) spawning area, so an additional WDFW in-water work restriction would not be necessary.

The proposed project is located more than 1.0 mile from the nearest active bald eagle (*Haliaeetus leucocephalus*) nest, but is located near numerous potential perch trees. Because the project is located greater than 1.0 mile from an active bald eagle nest, a timing restriction is not necessary during the bald eagle breeding season. However, because the project site is located within a bald eagle foraging area (mouth of a salmon spawning stream), no work may be conducted during the winter foraging period (31 October through 31 March).

The combined fish and wildlife timing restrictions are depicted graphically below. The applicant would comply with any amendments made to the below timing restrictions following USACE, NOAA Fisheries and USFWS review.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fish protection	No in-water work							No in-water work				
Bald eagle protection	No work							No work				
Combined	No work		No in-water work					No in-water work			No work	

## 1.2 Action Area

“Action area” is defined as “all areas to be affected directly or indirectly by the proposed action and not merely the immediate area involved in the action.” Based on the analysis below, the disturbance effects of this project on chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), and bull trout (*Salvelinus confluentus*) would be realized only at the site of log structure placement in Coal Creek at and near its mouth at Lake Washington and within a 100-foot in-water radius of substrate-disturbing activities. No other areas would be affected directly or indirectly.

According to the USFWS, loud activities can affect foraging or nesting bald eagles up to 1.0 mile away. Thus, the action area for bald eagles would be within a 1.0-mile radius of the proposed construction activity.

## 2. Location

The proposed project site is located on the east shore of Lake Washington on the northwest side of Newport Shores, south of Interstate 90 at 73 & 75 Skagit Key, Bellevue, Washington 98006; King County; NE ¼ Section 17, Township 24 North, Range 5 East, Willamette Meridian (see Figure 1). Tax parcel numbers: 6065310400 and 6065310410.

**Baseline Conditions**Lake Washington

The lake-oriented baseline conditions that chinook and coho salmon, and bull trout presently face in the Lake Washington watershed are described in the *Special Public Notice: Endangered Species Act Guidance for New and Replacement Piers and Bulkheads in Lake Washington, Lake Sammamish, and the Ship Canal, Including Lake Union* (SPN) (USACE et al. 2001) and the *Salmon and Steelhead Habitat Limiting Factors Report for WRIA 8* (Kerwin 2001). The baseline conditions for Lake Washington and the action area are summarized in Table 1 below.

Table 1. Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators – Draft modified by NOAA Fisheries for lakes.

PATHWAYS INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
	Properly Functioning	At Risk <sup>1</sup>	Not Prop. Functioning	Restore <sup>1</sup>	Maintain <sup>2</sup>	Degrade <sup>3</sup>
<b>Water Quality</b>						
Temperature/Dissolved Oxygen		X			X	
pH		X			X	
Chem. Contamination		X			X	
Nutrients/Total P		X			X	
<b>Habitat Access</b>						
Physical Barriers		X			X	
<b>Habitat Elements</b>						
Exotic Species (in water)			X		X	
Shoreline Upwelling/ Downwelling			X		X	
Structural Complexity (LWD/emergent/ submergent vegetation)		X		Minor improvement in action area	X	
Substrate Composition			X		X	
<b>Shoreline Conditions</b>						
Shoreline Vegetation and Riparian Structure			X	Action area	X	
Shoreline Gradient			X	Action area	X	

<sup>1</sup> For the purposes of this checklist, "restore" means to change the function of an "at risk" indicator to "properly functioning," or to change the function of a "not properly functioning" indicator to "at risk" or "properly functioning" (i.e., it does not apply to "properly functioning" indicators).

<sup>2</sup> For the purposes of this checklist, "maintain" means that the function of an indicator does not change (i.e., it applies to all indicators regardless of functional level).

<sup>3</sup> For the purposes of this checklist, "degrade" means to change the function of an indicator for the worse (i.e., it applies to all indicators regardless of functional level). In some cases, a "not properly functioning" indicator may be further worsened, and this should be noted.

Coal Creek

Coal Creek is located in the southern part of the City of Bellevue, its headwaters originating in the steep terrain of Cougar Mountain, about 1,400 feet in elevation. The creek is about 7 miles

Table 2. Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators. (completed at scale of Coal Creek Basin with action area effects noted where different)

PATHWAYS INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
	Properly <sup>1</sup> Functioning	At Risk <sup>1</sup>	Not Prop. <sup>1</sup> Functioning	Restore <sup>2</sup>	Maintain <sup>3</sup>	Degrade <sup>4</sup>
<b>Water Quality</b>						
Temperature		X	X (bull trout)		X	
Sediment/Turbidity			X		X	
Chem. Contam./Nut.		X			X	
<b>Habitat Access</b>						
Physical Barriers		X		action area	X	
<b>Habitat Elements</b>						
Substrate		X			X	
Large Woody Debris			X	action area	X	
Pool Frequency		X		action area	X	
Pool Quality		X		action area	X	
Off-Channel Habitat		X			X	
Refugia			X		X	
<b>Channel Cond. &amp; Dyn.</b>						
Width/Depth Ratio		X			X	
Streambank Cond.		X		action area	X	
Floodplain Connectivity		X			X	
<b>Flow/Hydrology</b>						
Peak/ Base Flows			X		X	
Drainage Network			X		X	
<b>Watershed Conditions</b>						
Road Dens. & Loc.			X		X	
Disturbance History			X		X	
Riparian Reserves			X		X	

<sup>1</sup> These three categories of function ("properly functioning," "at risk," and "not properly functioning") are defined for each indicator in the "Matrix of Pathways and Indicators"

<sup>2</sup> For the purposes of this checklist, "restore" means to change the function of an "at risk" indicator to "properly functioning," or to change the function of a "not properly functioning" indicator to "at risk" or "properly functioning" (i.e., it does not apply to "properly functioning" indicators).

<sup>3</sup> For the purposes of this checklist, "maintain" means that the function of an indicator does not change (i.e., it applies to all indicators regardless of functional level).

<sup>4</sup> For the purposes of this checklist, "degrade" means to change the function of an indicator for the worse (i.e., it applies to all indicators regardless of functional level). In some cases, a "not properly functioning" indicator may be further worsened, and this should be noted.

1. Water Quality: Coal Creek is listed on the Washington Department of Ecology's 2002/2004 303(d) list in Category 5 for fecal coliform (one entry), pH (two entries) and temperature (four entries). One entry in Category 4a for dissolved oxygen is also listed. Both Categories 4a and 5 indicate polluted waters; Category 4a waters already have an actively implemented TMDL (Total Maximum Daily Load) program in place (<http://apps.ecy.wa.gov/wats/>

experienced by the creek. Flows in the creek have clearly increased in magnitude and volatility due to the extensive and pervasive development within the upstream portions of the basin. However, the fairly broad, active flood plain area to the north of the stream through the project reach tends to moderate the potential impacts of these flows and, as a result, the physical form and functioning of the channel just upstream of the mouth are in relatively good shape. The stream banks are moderately stable.

The Coal Creek watershed consists of a system of ravines and so has likely never been particularly well connected to a floodplain. However, land management practices, such as agriculture and timber harvest, have decreased floodplain connections further. Some of these riparian disturbances may have ceased following re-development that required compliance with protective stream buffer regulations.

5. Flow/hydrology: Changes in basin hydrology, including increases in peak flows, have clearly accompanied the extensive development that has occurred throughout the basin, including past mining activities. Likewise, drainage network density has increased due to the extensive network of roads which have been built in the basin.
6. Watershed Conditions: In summary, the Coal Creek basin has experienced a relatively high degree of disturbance as it has been changed from its original, old-growth forest character to its present state which includes numerous roads and significant areas of residential and commercial development. Although present, riparian reserve areas are fragmented and disconnected. Additionally, areas large enough to be considered refugia are generally not present.

## 5. Species Information and Site Use

Site-specific information about each species is presented below. Stream- and lake-specific life history information related to temperature, diet, and migration is contained in the Federal Register listings (U.S. Federal Register, 24 March 1999; U.S. Federal Register, 25 July 1995; U.S. Federal Register, 1 November 1999; U.S. Federal Register, 12 July 1995) and the SPN.

### 5.1 Chinook Salmon

In the Lake Washington watershed, summer/fall-run chinook salmon migrate through Lake Washington to reach spawning habitat in the Cedar and Sammamish River systems as well as other Lake Washington tributaries. Occasional beach spawning within Lake Washington has been observed (Roberson 1967; Fresh, pers. comm., 28 March 2000). Adults begin migrating into fresh water in June, peaking in August, and spawn in the tributaries to Lake Washington from mid-August to mid-December, peaking in October (Myers et al. 1998). Priority Habitats and Species (PHS) data from the Washington Department of Fish and Wildlife (WDFW) indicate that fall chinook salmon occur in and near the action area in Coal Creek as well as Lake Washington (WDFW 2005). Chinook use of Coal Creek is mapped as extending approximately 2 miles upstream of the project area (as far upstream as the vicinity of SE 60<sup>th</sup> Street) on King County's *Known Freshwater Distribution for Chinook Salmon for WRIA 8*.

short term severe declines in escapement numbers and remained depressed as reported in the 2002 SASSI update due to continued chronically low escapements.

In conclusion, juvenile coho may be migrating through and/or rearing in the action area from mid-March through June. These include fish that may have originated in Coal Creek as well as those produced in other tributaries and arriving in the action area via Lake Washington. Adult coho may pass through the action area from August to December (but more typically during the October through November period) to ascend Coal Creek and/or pass along the lake Washington shore en route to other tributaries, including the Cedar River.

### 5.3 Bull Trout

Lake Washington. Native char are not commonly observed within Lake Washington. Bull trout are observed at the Ballard Locks every year with numbers observed or caught varying from three to nine fish per year (Goetz, pers. comm., 14 May 2004). Bull trout entering and exiting the Ship Canal would likely occur between February and June, with those fish most likely coming from North Puget Sound tributaries. They are observed/caught at the Locks between May and July; little or no monitoring occurs at the Locks from February through April, so data is not available for that period. In 2003, two bull trout were observed entering the Ship Canal in June (Goetz, pers. comm., 14 May 2004). In Lake Washington, bull trout have been caught and observed during winter and spring, typically in the south Lake Washington/Cedar River area.

Little is known about their distribution and use of habitat within Lake Washington. Expectations of bull trout distribution and habitat-use in the Lake Washington system have been based upon the extrapolation of such information from other bull-trout populations. Bull trout would not be expected within the littoral zone when nearshore temperatures exceed 15°C (generally, from May through mid-October). Juvenile bull trout would remain in headwater streams until the onset of piscivory, at a body length of approximately 300 mm, at which point they would migrate as subadults in search of improved foraging opportunities. Subadult bull trout often migrate with adults to headwater streams during the summer and fall, and return to larger rivers to overwinter. Bull trout may be attracted to spawning aggregations of prey fish such as longfin smelt. Many native char in populations from north Puget Sound exhibit anadromy, migrating to marine waters in late winter.

In conclusion, the presence of juvenile bull trout in Lake Washington is very limited to unlikely and subadult and adult bull trout in the lake would not be subjected to similar predation pressure as juveniles. Adult and subadult bull trout would avoid the littoral zone during the summer due to excessive water temperatures.

Coal Creek. The 1998 WDFW *Washington Salmonid Stock Inventory, Appendix; Bull Trout and Dolly Varden* (SASI) states that reproducing populations of bull trout “have not been confirmed in the lower Cedar River, Lake Washington, Lake Sammamish, or their tributaries.” Bull trout generally require colder water than can be provided by Coal Creek for successful spawning and egg incubation. In the North Puget Sound region, for bull trout “the downstream limit of successful spawning is always upstream of the winter snow line (that elevation at which snow is present on the ground for much of the winter)” (WDFW 1999). Given that there are no areas within the Coal Creek basin high enough in elevation to have a winter snow line, successful bull

- c) To prevent siltation, stream flows would be routed around certain project areas during construction, depending on the type and extent of work involved. Fish would be captured and safely removed as necessary from those localized project areas where in-stream work is required.
- d) Prior to commencement of excavation, a sedimentation control curtain would be installed around the work area.
- e) In-lake construction shall be performed from a barge or workboat.
- f) All construction debris shall be properly disposed of on land in such a manner that it cannot enter into the waterway or cause water quality degradation (Section 13, Rivers and Harbors Act).
- g) Erosion and sediment control measures would be implemented as appropriate during and following installation of the proposed plantings, including measures for both the short-term and permanent stabilization of exposed soils, such as silt fence or erosion-control mulch.

Construction of the proposed project is anticipated to take two weeks. Studies investigating the effects of construction-related turbidity on salmonids in a lacustrine environment have not been located. Turbidity is generally considered an undesirable condition for salmonids, as exposure to turbid water can result in lethal and sublethal affects. However, localized temporary turbidity from an individual construction activity would not represent a permanent sediment source and would not produce conditions of chronic exposure, but exposure could be acute.

Considering that the turbidity produced by construction activity would be localized and temporary, the most probable impact on juvenile chinook or coho would be a behavior modification (avoidance response) rather than injury or reduction in growth potential. An avoidance response could expose chinook or coho to increased predation or force them away from preferred foraging areas.

The most effective strategy for minimizing or eliminating potential construction-related impacts would be to restrict construction to periods when the presence of bull trout, chinook salmon, or coho salmon is improbable. The combined fish- and wildlife-protection prohibitions by NOAA Fisheries, USFWS and WDFW result in an allowable construction window of 16 July through 31 July. This window is adequate to minimize the probability that bull trout, chinook salmon, or coho salmon would be in the action area during construction. Additionally, the proposed implementation conditions are sufficient to avoid or minimize project-related turbidity. Thus, temporary water-quality impacts associated with the proposed project are unlikely to result in the take of a listed or sensitive fish species.

2. Habitat Health (vegetated shallows): The work boat and barge used for construction could disturb vegetated shallows during the implementation of the project. Vegetated shallows provide refuge and foraging habitat for juvenile salmonids and forage fish. Boat activity in or adjacent to vegetated shallows has been documented to damage and/or destroy habitat (Fonseca et al. 1998). However, in such circumstances that the substrate was disturbed by the barge, the action would be temporary and minimal since the barge would not be moving around. Thus, impacts to vegetated habitat are insignificant and/or discountable.

### Collective Effects

According to the SPN (USACE et al. 2001), incorporation of impact minimization measures (such as control of construction-related impacts) and conservation measures (such as log installation) reduces the collective impact of proposed projects. The placement of the numerous in-water log structures proposed will likely enhance the habitat conditions in the action area relative to the baseline conditions. The proposed timing restrictions and other conditions would minimize the potential for construction-related impacts.

## **6.2 Bald Eagle**

As previously mentioned, the nearest nesting bald eagle pair is more than 1.0 mile away. Bald eagle habitat would not be destroyed by the project, nor would prey abundance be reduced. Populations of wildlife species preyed on by bald eagles, such as waterfowl, would not be affected.

As stated in Section 1, the proposed project is located near numerous potential perch trees. Because the project is located greater than 1.0 mile from an active bald eagle nest, no timing or equipment restrictions are necessary during the breeding season. However, because the project site is located within a bald eagle foraging area (mouth of a salmon-spawning stream), work is prohibited between 31 October and 31 March.

## **7. Critical Habitat**

### **7.1 Chinook Salmon**

Critical habitat was designated for Puget Sound chinook salmon on 2 September 2005 (U.S. Federal Register), specifically including the Lake Washington sub-basin. Designated critical habitat for Lake Washington does not specifically include Coal Creek, but includes those areas within the ordinary high water mark as defined for the lake. As such, all or nearly all of the project area is included within the designated critical habitat for chinook salmon. Critical habitat includes areas with physical or biological features essential to the conservation of the species and which may require special management considerations or protection. Constituent elements of critical habitat for chinook salmon are listed as:

1. Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;
2. Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks;
3. Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;

Creek. Given the direct, indirect, interrelated, and interdependent effects from the proposed action, the proposed project:

- **would not adversely modify the critical habitat of the Puget Sound chinook salmon.**

## 7.2 Coho Salmon

Critical habitat has not been proposed for coho salmon.

## 7.3 Bull Trout

The action area includes critical habitat for bull trout, which includes Lake Washington and has been defined for lakes as “the perimeter of the water body as mapped on standard 1:24,000 scale maps” (U.S. Federal Register, 26 September 2005). The action area is in the *Puget Sound Unit* (Unit 28), *Lake Washington CHSU* (critical habitat subunit). Bull trout critical habitat includes these primary constituent elements (excerpted from the final rule, U.S. Federal Register, 26 September 2005):

1. Water temperatures ranging from 36 to 59 [deg]F (2 to 15 [deg]C), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life history stage and form, geography, elevation, diurnal and seasonal variation, shade, such as that provided by riparian habitat, and local groundwater influence;
2. Complex stream channels with features such as woody debris, side channels, pools, and undercut banks to provide a variety of depths, velocities, and instream structures;
3. Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine substrate less than 0.25 in (0.63 cm) in diameter and minimal substrate embeddedness are characteristic of these conditions;
4. A natural hydrograph, including peak, high, low, and base flows within historic ranges or, if regulated, a hydrograph that demonstrates the ability to support bull trout populations by minimizing daily and day-to-day fluctuations and minimizing departures from the natural cycle of flow levels corresponding with seasonal variation;
5. Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity;
6. Migratory corridors with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and foraging habitats, including intermittent or seasonal barriers induced by high water temperatures or low flows;
7. An abundant food base including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish;
8. Few or no nonnative predatory, interbreeding, or competitive species present; and
9. Permanent water of sufficient quantity and quality such that normal reproduction, growth and survival are not inhibited.

According to the Federal Register, Lake Washington and Lake Union “provides FMO [foraging, migratory and overwintering] habitat for amphidromous bull trout outside of currently delineated core areas in the Puget Sound Recovery Unit.” Project activities that introduce or remove

- would not adversely modify critical habitat of the Coastal-Puget Sound bull trout.

#### 7.4 Bald Eagle

Critical habitat has not been proposed or designated for the bald eagle.

### 8. Essential Fish Habitat

Discussions regarding essential fish habitat (EFH) related to Pacific salmon present in Lake Washington and Coal Creek are indirectly included in this BE. The information below identifies where these discussions are located within the BE and concludes with a determination of effect. In accordance with the comments from the USACE and prior concurrence letters from NOAA Fisheries, this discussion should be considered sufficient to make this determination.

Description of the Project / Proposed Activity: The project description and location are described within the first two sections of the BE. This description gives a thorough explanation of the construction plan and activities. Pacific salmon species for which EFH has been designated in Lake Washington include chinook and coho salmon (no stock of Puget Sound pink salmon has been identified as utilizing the Lake Washington basin; they generally do not occur upstream of lakes).

Potential Adverse Effects of the Proposed Project: The following is a description of Pacific salmon EFH as per the federal Fisheries Management Plan (FMP). EFH for the Pacific coast salmon fishery means those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem. To achieve that level of production, EFH includes all those streams, lakes, ponds, wetlands, and other currently viable water bodies and most of the habitat historically accessible to salmon in Washington, Oregon, Idaho and California. Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (i.e. natural waterfalls in existence for several hundred years).

Potential impacts to Pacific salmon chinook and coho EFH, as described in the BE in Section 6, include a significant improvement in refuge and forage conditions, immediately and continuing to improve over time, resulting from additional streamside vegetation and the placement of log habitat structures. Placed log structures will accentuate pool/riffle sequencing and thereby improve spawning and rearing conditions for salmonid fish and improve aquatic insect production. A minor and temporary decrease in overhanging streamside vegetation, expected to persist for one year or less, will result due to the removal of shrubby vegetation needed to gain access to localized areas of log structure placement and bank re-formation. Limited and temporary potential impacts to refuge, migration, and forage conditions at the Lake Washington shoreline and along the lowermost reach of Coal Creek may result from a temporary degradation in water quality due to proposed construction activities, primarily log structure placement. Any such impacts will be short-lived, however.

## 10. Determination of Effect

Determination of effect for all the species included in this report and their respective assessment areas are listed in Table 5. The proposed project may affect, not likely to adversely affect, Puget Sound chinook salmon, and is not likely to jeopardize Puget Sound-Strait of Georgia coho salmon. The proposed project may affect, not likely to adversely affect, Coastal-Puget Sound bull trout and the bald eagle.

Given the direct, indirect, interrelated, and interdependent effects from the proposed action, the proposed project would not adversely modify the critical habitat of the Puget Sound chinook salmon or the Coastal-Puget Sound bull trout.

The collective impact of the proposed project may affect, not likely to adversely affect, Pacific chinook or coho salmon EFH.

Table 5. Determinations of Effect.

Species	Overall Project Effect	Effect on Critical Habitat	Effect on EFH
Puget Sound Chinook Salmon	May affect, not likely to adversely affect	Would not adversely modify	May affect, not likely to adversely affect
Coastal-Puget Sound Bull Trout	May affect, not likely to adversely affect	Would not adversely modify	N/A
Puget Sound-Strait of Georgia Coho Salmon	Not likely to jeopardize	N/A	May affect, not likely to adversely affect
Bald Eagle	May affect, not likely to adversely affect	N/A	N/A

USACE, National Marine Fisheries Service (NOAA Fisheries), and U.S. Fish and Wildlife Service (USFWS). 2001. Special Public Notice: Endangered Species Act Guidance for New and Replacement Piers and Bulkheads in Lake Washington, Lake Sammamish, and the Ship Canal, Including Lake Union. 11 pp.

U.S. Federal Register Volume 70, No. 185, 26 September 2005, final rule – designation of critical habitat for populations of bull trout.

\_\_\_\_\_ Volume 70, No. 170, 2 September 2005, final rule –designation of critical habitat for populations of chinook salmon.

\_\_\_\_\_ Volume 69, No. 73, 15 April 2004, establishment of species of concern–designation of coho salmon - *Oncorhynchus kisutch*.

\_\_\_\_\_ Volume 64, No. 210, 1 November 1999, final rule - *Salvelinus confluentus*

\_\_\_\_\_ Volume 64, No. 128, 6 July 1999, proposed rule - *Haliaeetus leucocephalus*

\_\_\_\_\_ Volume 64, No. 56, 24 March 1999, final rule - *Oncorhynchus tshawytscha*.

\_\_\_\_\_ Volume 60, No. 133, 12 July 1995, final rule - *Haliaeetus leucocephalus*

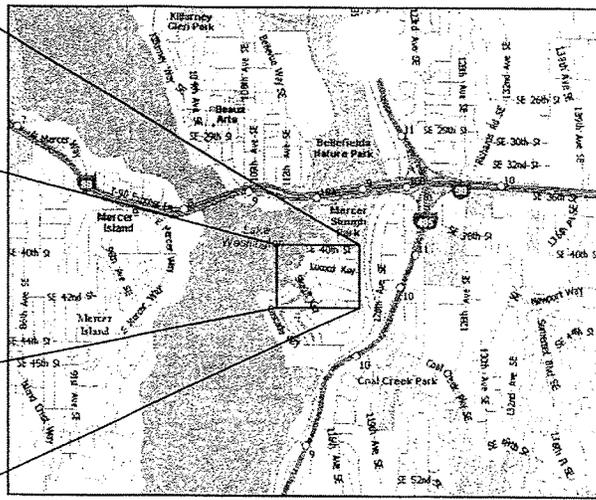
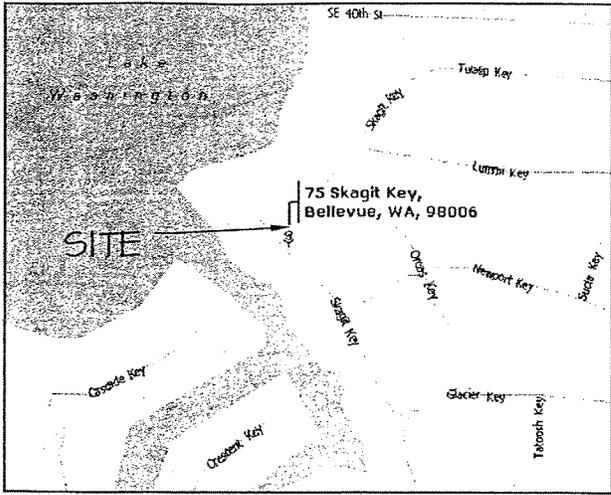
\_\_\_\_\_ Volume 60, No. 142, 25 July 1995, proposed rule - *Oncorhynchus kisutch*.

Washington Department of Fish and Wildlife (WDFW). 2004. Priority Habitats and Species database search results prepared for The Watershed Company, 19 February 2004.

Washington Department of Fisheries (WDF), Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1993. 1992 Washington State salmon and steelhead stock inventory. March 1993. Olympia, WA. 212 p.

## **Appendix A**

### **STREAM RESTORATION PLANS**

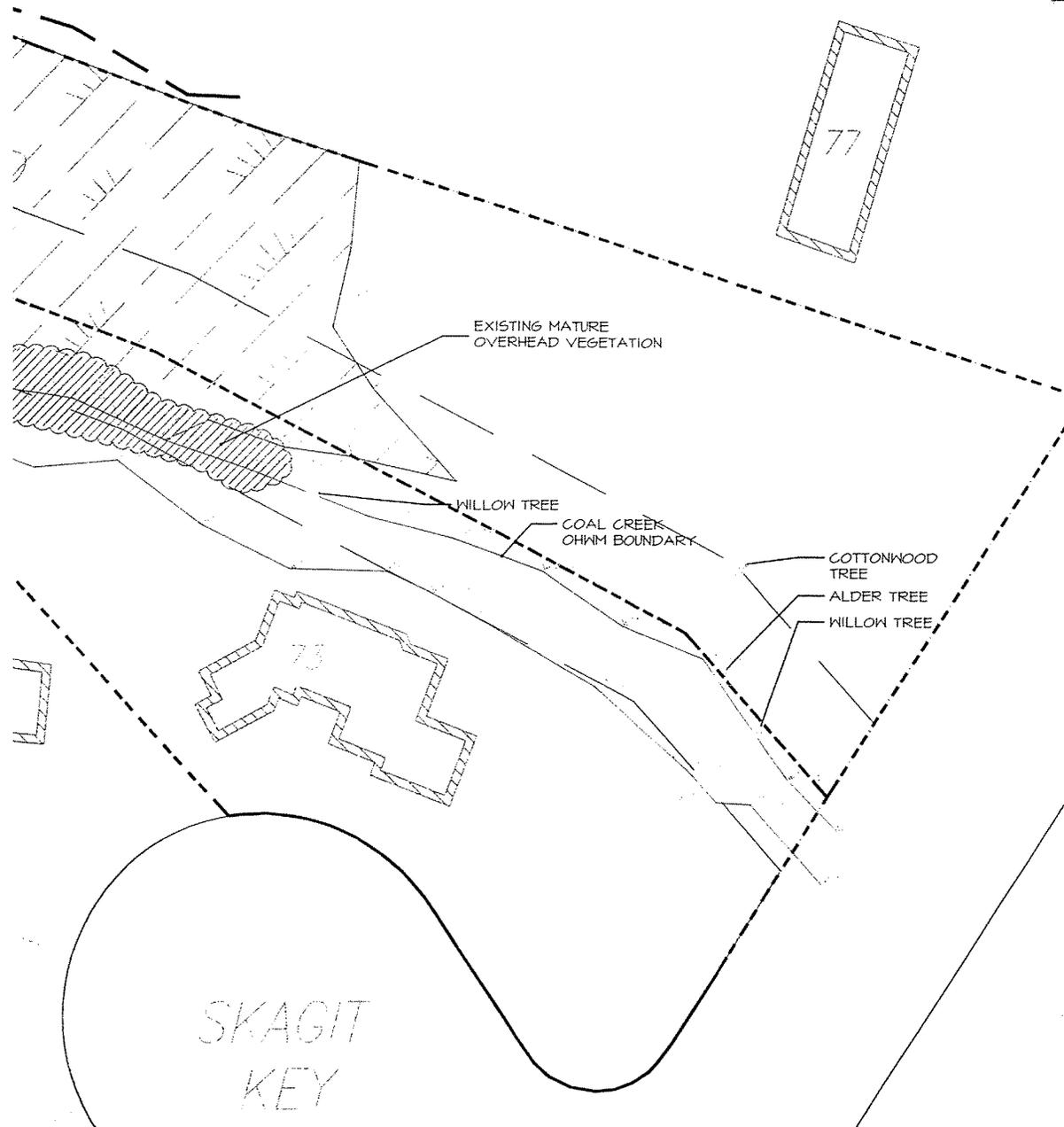


VICINITY MAP



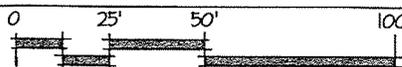
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2	10/21/03	REVIEW SET
3	3/6/06	PERMIT SET

PROJECT MANAGER:	6J
DESIGNED:	DRAFTING: 6L
CHECKED:	FILED: 2003 CONCEPT PLAN



EXISTING CONDITION

SCALE: 1" = 50' - 0"



BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES ACCORDINGLY



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CLIENT:

**BILL WEINSTEIN**

ADDRESS:

75 SKAGIT KEY  
 BELLEVUE  
 WASHINGTON 98008

TITLE:

**COAL CREEK SALMON CHANNEL ENHANCEMENT PLAN**

JOB NUMBER:

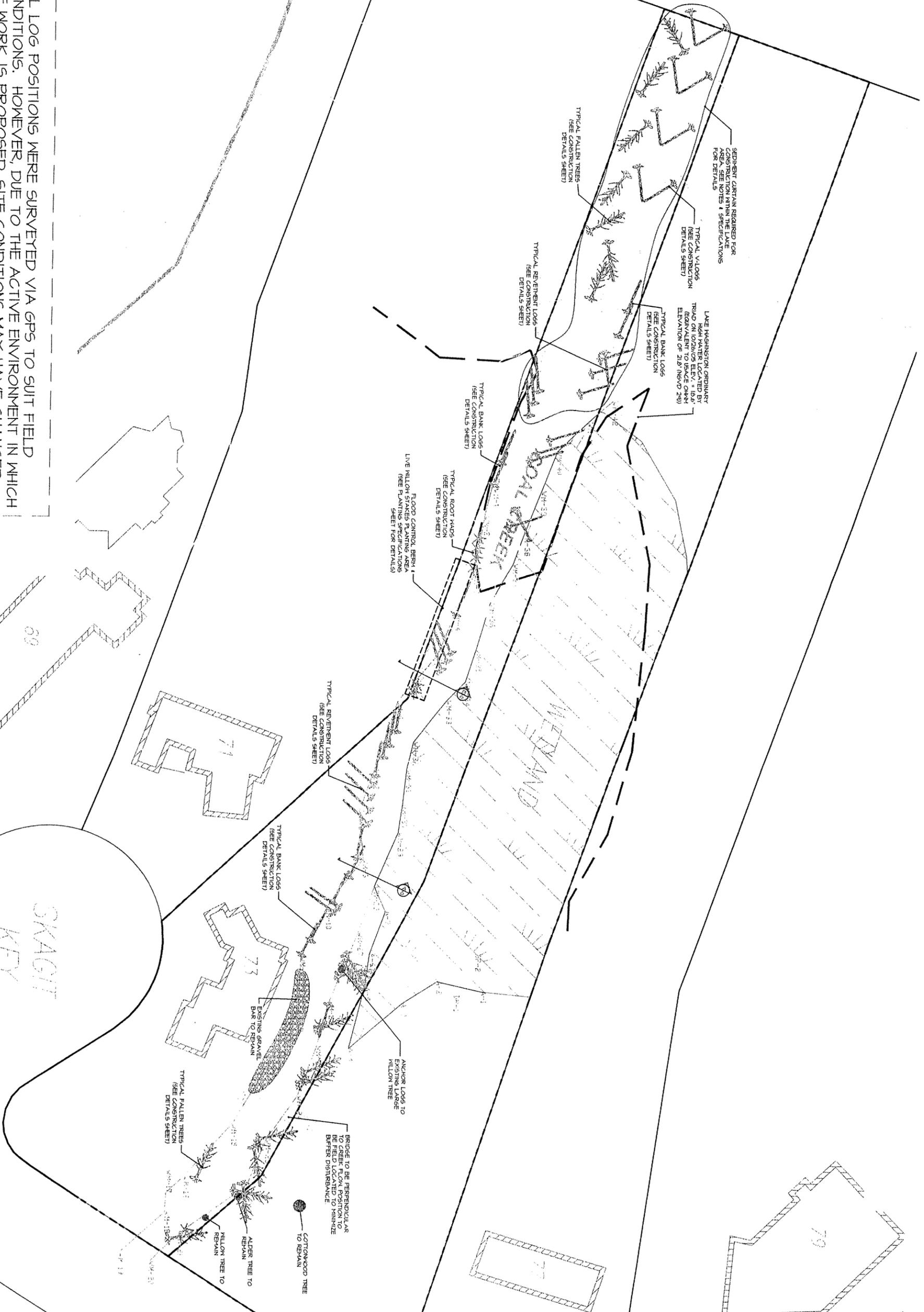
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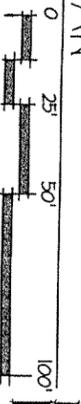
WASHINGTON

NOTE: ALL LOG POSITIONS WERE SURVEYED VIA GPS TO SUIT FIELD CONDITIONS. HOWEVER, DUE TO THE ACTIVE ENVIRONMENT IN WHICH THE WORK IS PROPOSED, SITE CONDITIONS MAY HAVE CHANGED. THEREFORE ALL LOG LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED DURING CONSTRUCTION TO SUIT NEW CONDITIONS.



PROPOSED OVERALL SITE PLAN

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 CHECKED BY: [blank]

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CLIENT:  
 BILL WEINSTEIN

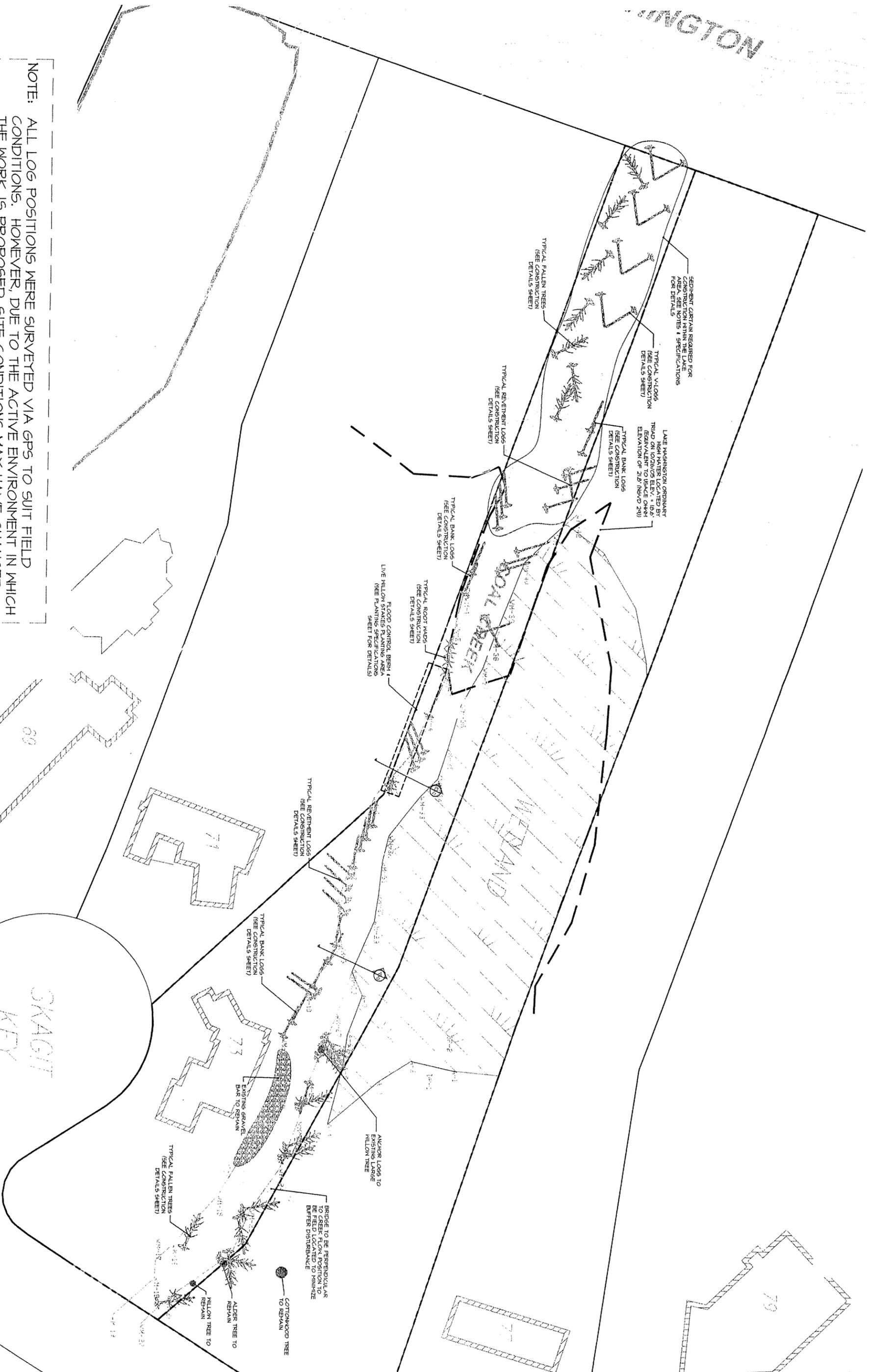
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 BELLEVUE,  
 WASHINGTON 98008

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 COAL CREEK  
 SALMON HABITAT  
 ENHANCEMENT  
 PLAN

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 SHEET NUMBER: CS2 of 7

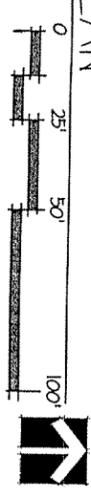
WASHINGTON

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PROPOSED OVERALL SITE PLAN

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2	1/24/05	REVIEW SET
3	3/6/06	PERMIT SET

PROJECT MANAGER: GJ  
 DESIGNED: JG  
 CHECKED: JG  
 FILED: GJ

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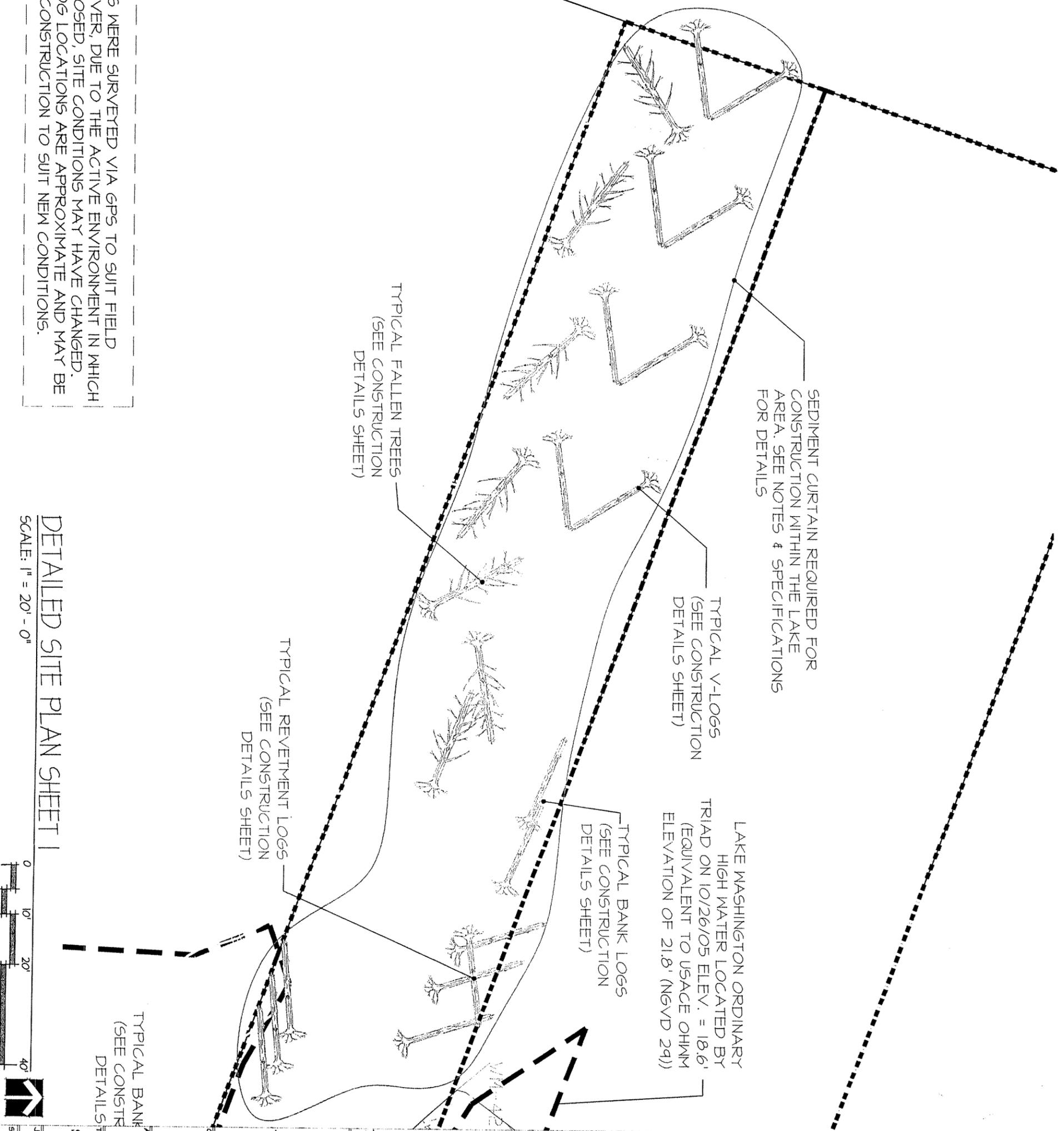
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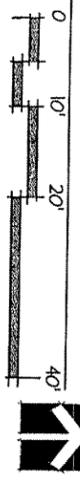
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**NOTE:** ALL LOG POSITIONS WERE SURVEYED VIA GPS TO SUIT FIELD CONDITIONS. HOWEVER, DUE TO THE ACTIVE ENVIRONMENT IN WHICH THE WORK IS PROPOSED, SITE CONDITIONS MAY HAVE CHANGED. THEREFORE ALL LOG LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED DURING CONSTRUCTION TO SUIT NEW CONDITIONS.



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2	07/26/05	REVIEW SET
3	3/6/06	PERMIT SET

PROJECT MANAGER: AJ  
 DESIGNED: PRAITHI  
 CHECKED: FILEMON  
 DRAWN: FILEMON

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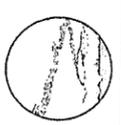
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 BILL WEINSTEIN

**ADDRESS:**  
 75 SKAGIT KEY  
 BELLEVUE,  
 WASHINGTON 98008

**TITLE:**  
 COAL CREEK  
 SALMON CHANNEL  
 ENHANCEMENT  
 PLAN

**JOB NUMBER:** 050520  
**SHEET NUMBER:** CS3 of 7

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NO.	DATE	ISSUE
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2		NOTES REVIEW SET
3		AMEND PERMIT SET

PROJECT MANAGER: GJ  
 DESIGNED: [Signature]  
 CHECKED: [Signature]



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**BILL WEINSTEIN**

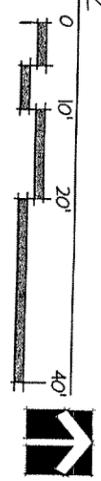
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 BELLEVUE,  
 WASHINGTON 98008

TITLE:  
 COAL CREEK  
 SALMON CHANNEL  
 ENHANCEMENT  
 PLAN

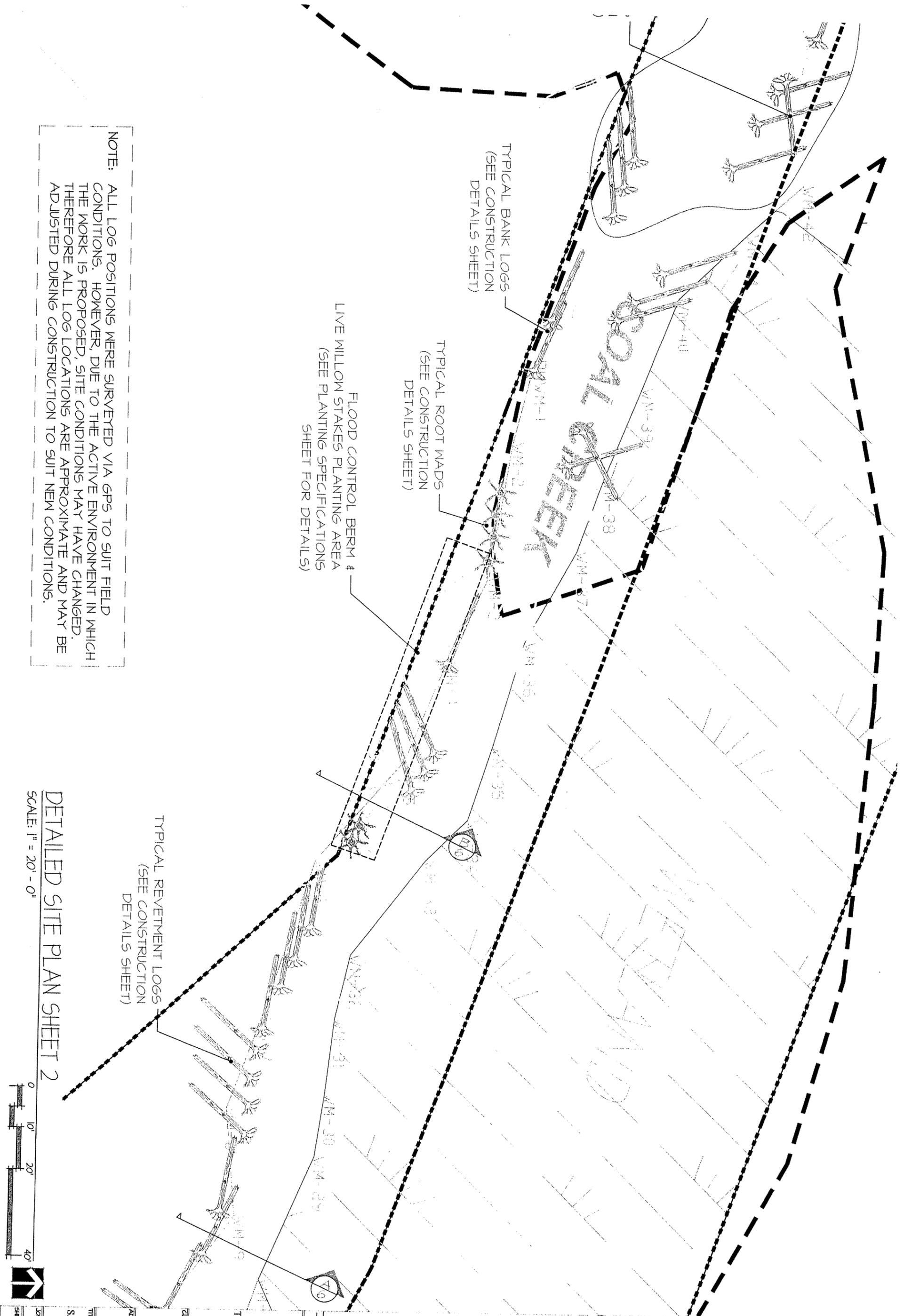
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DETAILED SITE PLAN SHEET 2  
 SCALE: 1" = 20' - 0"



**NOTE:** ALL LOG POSITIONS WERE SURVEYED VIA GPS TO SUIT FIELD CONDITIONS. HOWEVER, DUE TO THE ACTIVE ENVIRONMENT IN WHICH THE WORK IS PROPOSED, SITE CONDITIONS MAY HAVE CHANGED. THEREFORE ALL LOG LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED DURING CONSTRUCTION TO SUIT NEW CONDITIONS.



NO.	DATE	ISSUE
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 DESIGNED: | DRAWN: |  
 CHECKED: | FILED: |



BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES ACCORDINGLY

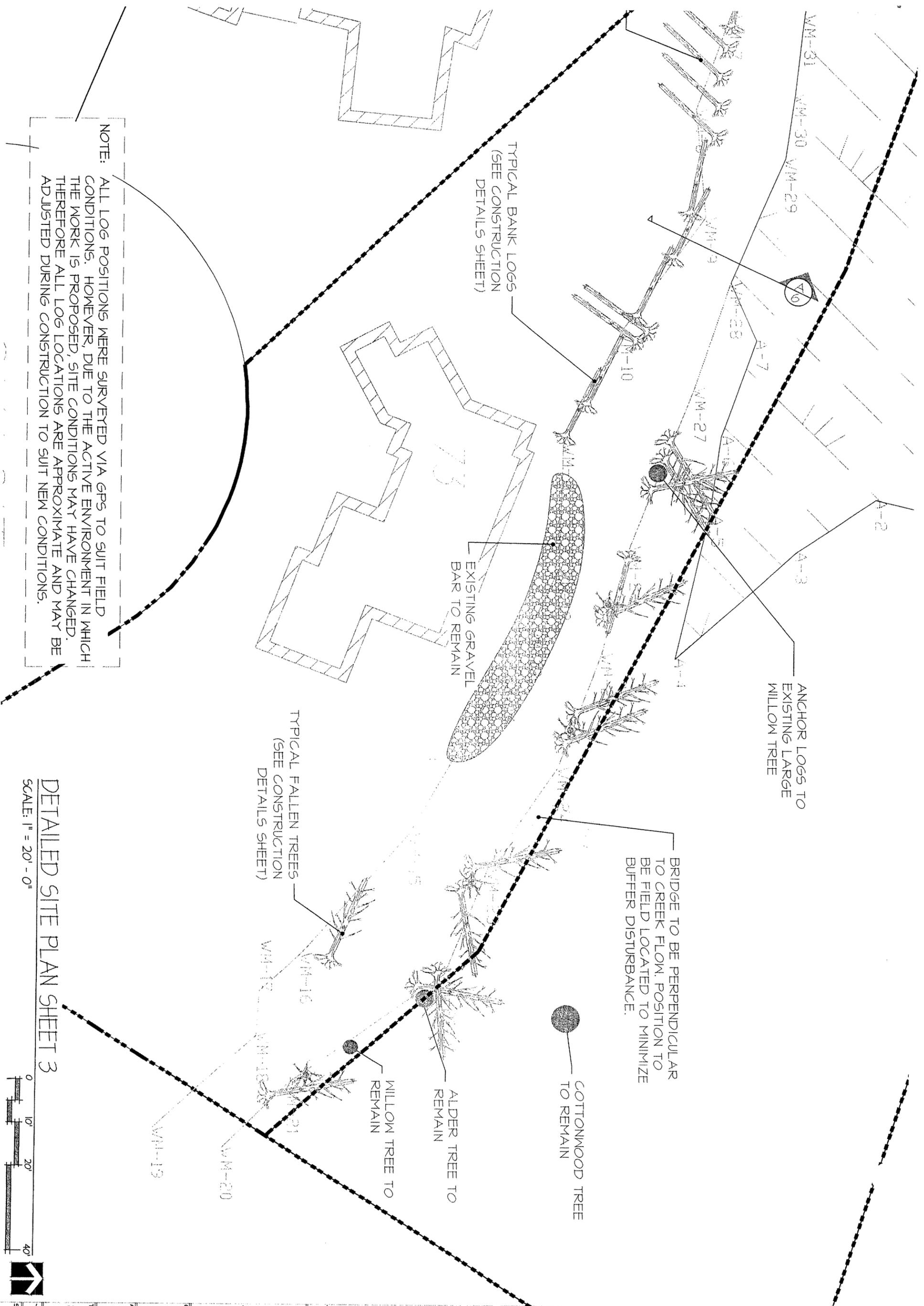
The Watershed Company  
 1410 Market Street  
 Kirkland, WA 98033  
 425.822.5242 Fax: 425.827.8136  
 watershed@watershedco.com  
 www.watershedco.com

CLIENT:  
**BILL WEINSTEIN**

ADDRESS:  
 75 SKAGIT KEY  
 BELLEVUE,  
 WASHINGTON 98008

TITLE:  
**COAL CREEK SALMON CHANNEL ENHANCEMENT PLAN**

JOB NUMBER: 050520  
 SHEET NUMBER: **CSS** OF 7



ANCHOR LOGS TO EXISTING LARGE WILLOW TREE

BRIDGE TO BE PERPENDICULAR TO CREEK FLOW. POSITION TO BE FIELD LOCATED TO MINIMIZE BUFFER DISTURBANCE.

COTTONWOOD TREE TO REMAIN

ALDER TREE TO REMAIN

WILLOW TREE TO REMAIN

EXISTING GRAVEL BAR TO REMAIN

TYPICAL BANK LOGS (SEE CONSTRUCTION DETAILS SHEET)

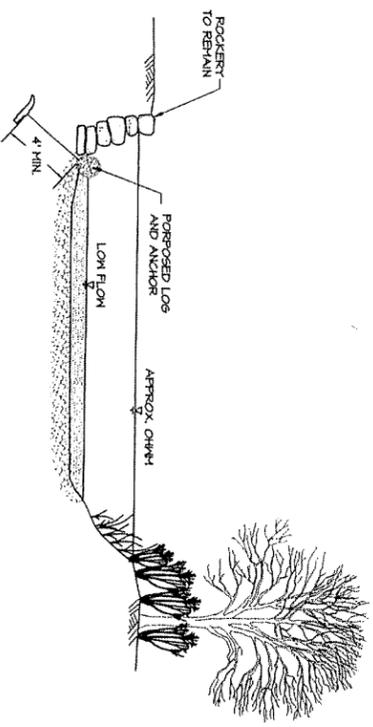
TYPICAL FALLEN TREES (SEE CONSTRUCTION DETAILS SHEET)

NOTE: ALL LOG POSITIONS WERE SURVEYED VIA GPS TO SUIT FIELD CONDITIONS. HOWEVER, DUE TO THE ACTIVE ENVIRONMENT IN WHICH THE WORK IS PROPOSED, SITE CONDITIONS MAY HAVE CHANGED. THEREFORE ALL LOG LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED DURING CONSTRUCTION TO SUIT NEW CONDITIONS.

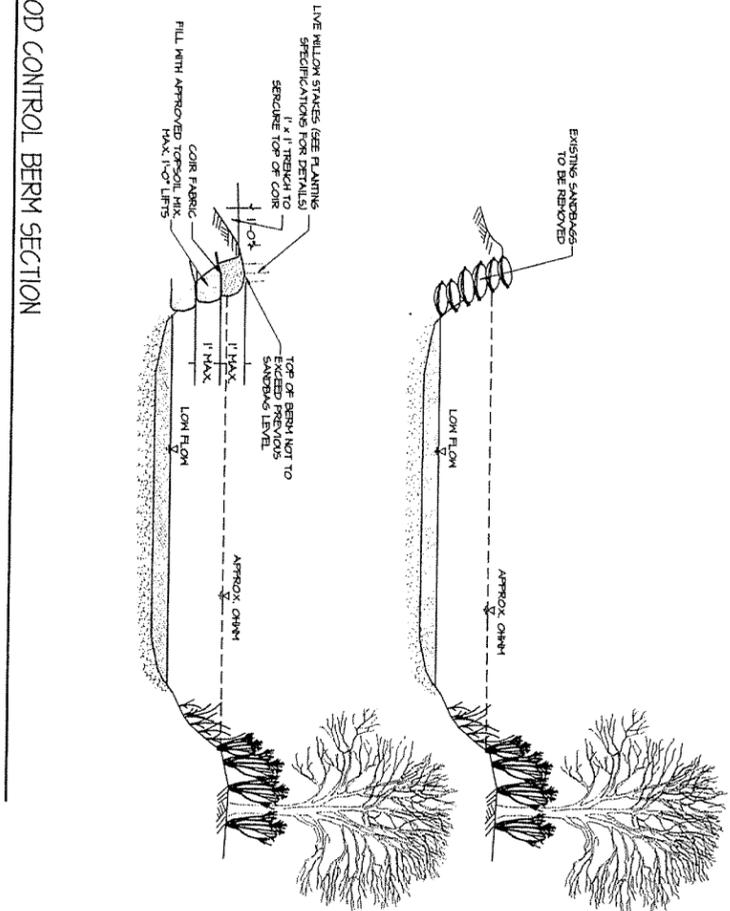
**DETAILED SITE PLAN SHEET 3**

SCALE: 1" = 20' - 0"

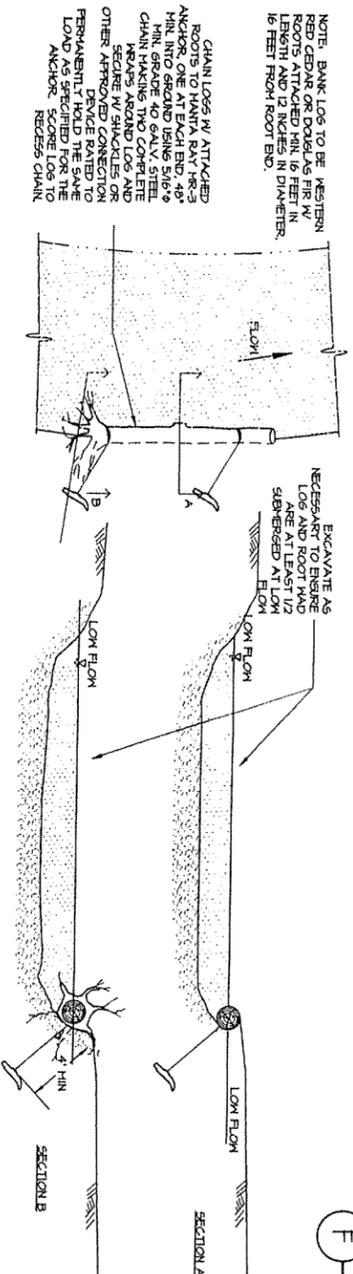




**A** EXISTING ROCK WALL AND PROPOSED BANK LOG SECTION  
NTS

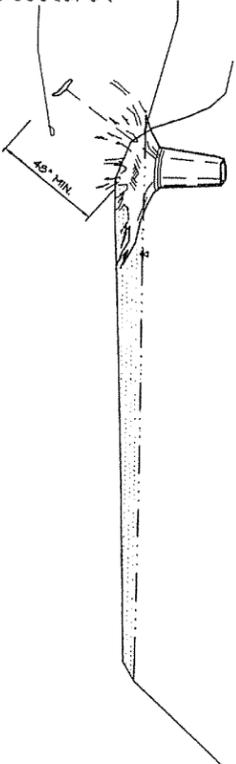


**B** FLOOD CONTROL BERM SECTION  
NTS

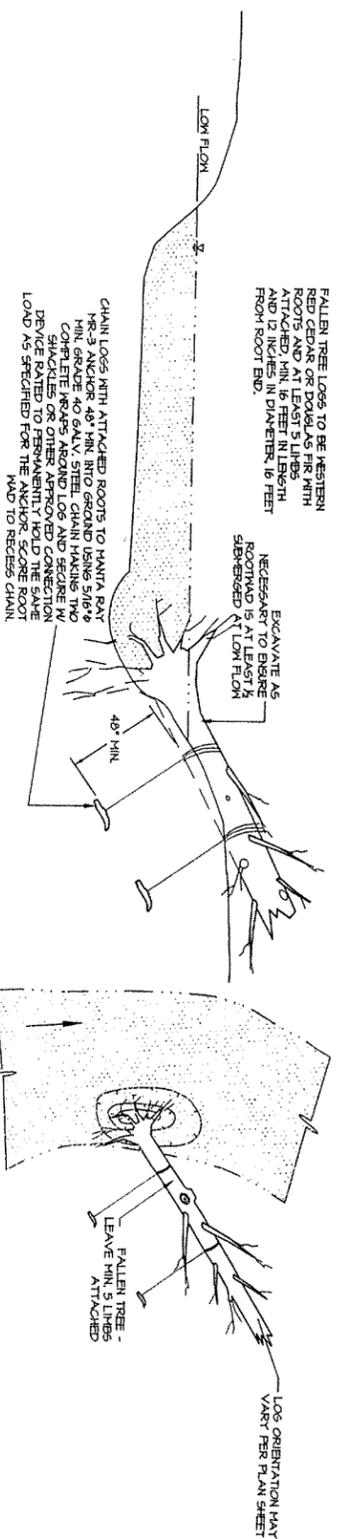


**C** TYP. BANK LOG INSTALLATION  
NTS

CHAIN ROOT WAD TO MAINTAIN RAY ANCHOR 48" MIN INTO GROUND USING 5/16" x 1/2" GALV. STEEL CHAIN MAKING TWO COMPLETE WRAPS AROUND LOG AND SECURE W/ SHU. CONNECTION OTHER APPROVED PERMANENTLY HOLD THE SAME LOAD AS SPECIFIED FOR THE ANCHOR. SCORE ROOT WAD TO RECESS CHAIN.

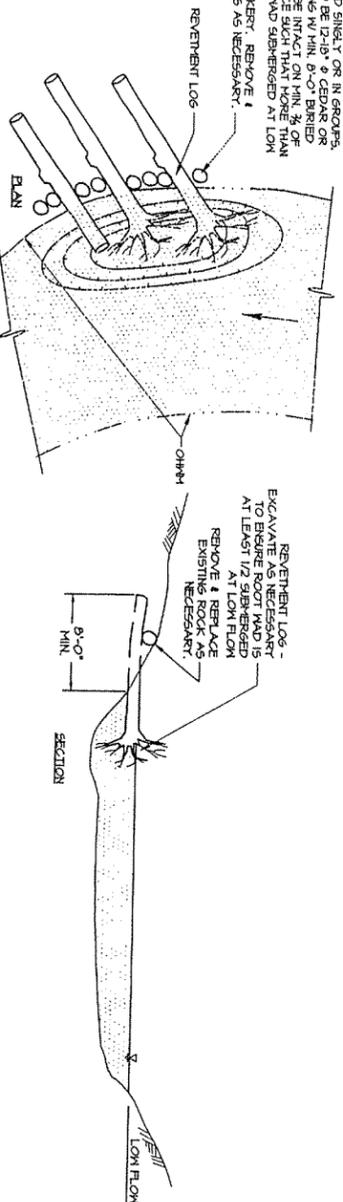


**D** TYP. ROOT WAD INSTALLATION  
NTS

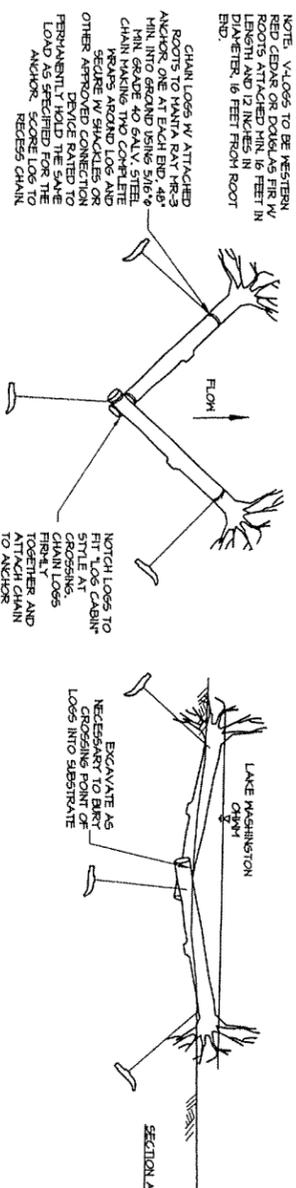


**E** TYP. FALLEN TREE INSTALLATION  
NTS

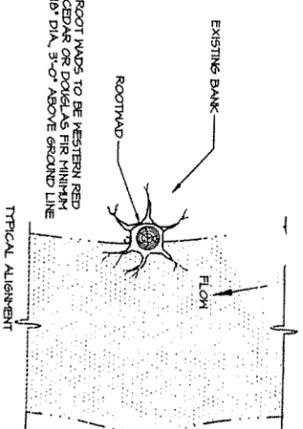
NOTES:  
1. LOGS MAY BE FLACKED SINGLE OR IN GROUPS.  
2. REVEMENT LOGS TO BE 12'-18" x 6" CEDAR OR FIR, A MIN. OF 12'-0" LONGS W/ MIN. 8'-0" BURRED INTO BANK. ROOTS TO BE INTACT ON MIN. 3/4 OF REVEMENT LOGS. FLAGE SUCH THAT MORE THAN 1/2 OF LOG OR ROOTWAD SLOBERGED AT LOW FLOW.  
EXISTING ROCKERY, REMOVE & REPLACE ROCKS AS NECESSARY.



**F** TYP. REVEMENT LOG INSTALLATION  
NTS



**G** TYP. V-LOGS INSTALLATION  
NTS



NO.	DATE	SCALE
1	07/24/09	REVIEW SET
2	02/21/09	REVIEW SET
3	3/8/08	PERMIT SET

PROJECT MANAGER: GJ  
DESIGNED: JSP/ANTHONY  
CHECKED: JSP/ANTHONY  
FILE NUMBER: 0809008



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**BILL WEINSTEIN**

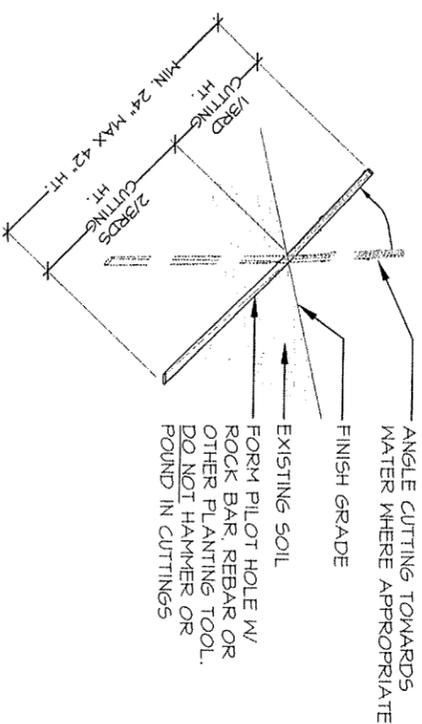
ADDRESS:  
75 SKAGIT KEY  
BELLEVUE,  
WASHINGTON 98008

TITLE:  
COAL CREEK  
SALMON CHANNEL  
ENHANCEMENT  
PLAN

JOB NUMBER: 050520  
SHEET NUMBER: CS6 OF 7

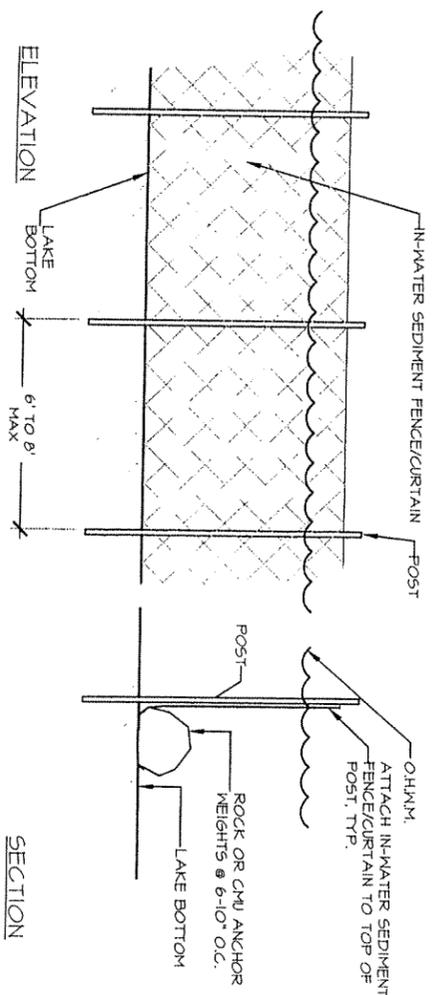
BAR 15 ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES ACCORDINGLY

- NOTES:
- CUTTING SHOULD BE ANGLE CUT (45°) AT THE BASE AND PERPENDICULAR CUT JUST ABOVE A NODE (BUD)
  - INSTALL CUTTING A MIN. OF 2/3RDS INTO SOIL, 1/8" O.C.
  - NODES (BUDS) MUST BE POINTING UP
  - FIRM UP SOIL AROUND INSTALLED CUTTING
  - WATER CUTTINGS AFTER PLANTING
  - INSTALL IRRIGATION SYSTEM



**H** TYP. LIVE STAKE PLANTING  
NTS

- PLANTING NOTES & SPECIFICATIONS:
- PRIOR TO PLANTING, LAYOUT 420 LIVE WILLOW STAKES @ 18" O.C. WITHIN THE 814 SF. OF FLOOD CONTROL BERM AREA FOR INSPECTION BY LANDSCAPE ARCHITECT OR PROJECT BIOLOGIST FROM THE WATERSHED COMPANY. PLANTS MAY BE FIELD ADJUSTED DEPENDING ON MICROSITE CONDITIONS.
  - PLANTS MUST MEET THE FOLLOWING MINIMUM STANDARDS:
    - PLANTS SHALL MEET OR EXCEED THE SPECIFICATIONS OF FEDERAL, STATE AND LOCAL LAWS REQUIRING INSPECTION FOR PLANT DISEASE AND INSECT CONTROL.
    - CUTTINGS WITH ABRASIONS OF THE BARK OR SINGLED WILL BE REJECTED.
    - SUBSTITUTIONS ARE NOT ALLOWED UNLESS A PRIOR AGREEMENT HAS BEEN MADE WITH THE PROJECT BIOLOGIST OR LANDSCAPE ARCHITECT AND ALL AGENCIES GRANTING PROJECT PERMITS.
- PROJECT IS SUBJECT TO INSPECTION AT ANY TIME. AN INITIAL LAYOUT INSPECTION AND A FINAL INSPECTION ARE REQUIRED.



**I** SEDIMENT CURTAIN  
NTS

**NOTES AND SPECIFICATIONS**

**APPROVAL**

IMPLEMENTATION OF THESE PLANS REQUIRES HYDRAULIC PROJECT APPROVAL FROM THE WASHINGTON STATE DEPARTMENT OF FISH AND WILDLIFE AND SECTION 404/10 PERMITS FROM US ARMY CORPS OF ENGINEERS. ADDITIONAL AGENCIES NOT LISTED ABOVE MAY ALSO BE INVOLVED IN THE REVIEW AND APPROVAL OF THIS PROJECT. A COPY OF ALL REQUIRED PERMITS AND APPROVALS SHALL BE ON-SITE AT ALL TIMES DURING CONSTRUCTION.

**SUPERVISION**

THE STREAM RESTORATION SPECIALIST REPRESENTING THE OWNER SHALL OVERSEE AND DIRECT ALL CONSTRUCTION ACTIVITIES. THE STREAM RESTORATION SPECIALIST MAY ADJUST THE SPECIFIC PLACEMENT AND ORIENTATION OF LOG STRUCTURES TO SUIT SITE CONDITIONS AT THE TIME OF CONSTRUCTION.

**CONSTRUCTION SEQUENCE**

- STAKE OUT PROPERTY LINES AND APPROXIMATE WORK-AREA LIMITS.
- IDENTIFY AND PROTECT ALL UTILITIES THAT MAY EXIST IN THE CONSTRUCTION AREA. ANY DAMAGE TO UTILITIES IDENTIFIED ON PLAN OR NOT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- INSTALL ALL TEMPORARY EROSION CONTROL MEASURES, GENERAL AND SITE-SPECIFIC, AS NOTED ON THE PLANS AND SUPPORTING DOCUMENTS OR AS REQUIRED BY VARIOUS PERMITS AND AUTHORIZATIONS.
- AT THE DISCRETION OF THE CONTRACTOR, WORK MAY PROCEED ALONG ENTIRE STREAM'S LENGTH AT ONCE, OR IN SEVERAL SEGMENTS SEQUENTIALLY, PROVIDED THAT ALL OTHER CRITERIA ARE MET.
- FOR WORK IN THE LAKE AREA, USE SEDIMENT CURTAINS (DETAIL "I" THIS SHEET) TO ISOLATE INDIVIDUAL WORK AREAS. FOR STREAMBANK WORK, PLACE GRAVEL-FILLED BAGS IN STREAM BED TO ISOLATE WORK AREAS FROM FLOWING WATER. PUMP ANY TURBID WATER COLLECTED IN ISOLATED STREAM AREAS TO NEARBY WELL-VEGETATED AREA FOR BIOFILTRATION AND/OR INFILTRATION.
- PLACE V-LOGS, BANK LOGS, REVENTMENT LOGS, FALLEN TREES, AND ROOTWADS AS SHOWN IN PLAN AND IN THE VARIOUS DETAILS. IT IS GENERALLY PREFERRED THAT ANCHORS BE PLACED AND SET PRIOR TO LOG PLACEMENT IN ORDER TO ACHIEVE DESIRED SETTING. FILL, HOWEVER, THIS CAN BE ALTERED AT THE DISCRETION OF THE CONTRACTOR AND WITH THE CONCURRENCE OF THE STREAM RESTORATION SPECIALIST. IT IS ANTICIPATED THAT THE PLACEMENT OF LOGS IN THE LAKE SHALL BE ACCOMPLISHED VIA A BARGE WITH A CRANE AND CLAMSHELL BUCKET. WORK ALONG STREAM BANK WILL LIKELY BE DONE WITH AN EXCAVATOR ON-SHORE.
- WHERE SANDBAGS ARE PRESENT, REMOVE ALL SANDBAGS AND REMOVE SAND FROM SITE. CONSTRUCT FLOOD CONTROL BERM IN PLACE OF SANDBAGS, AND TO THE SAME ELEVATION AS THE SANDBAGS. DEPENDING ON THE EXTENT OF THE EXISTING SANDBAGS, THE FLOOD CONTROL BERM MAY NEED TO BE CONSTRUCTED AS MULTIPLE LAYERS OR "LIFTS" OF COIR-WRAPPED TOPSOIL. EACH LIFT TO BE A MAXIMUM OF 1 FOOT HIGH. FACE AND TOP OF FLOOD CONTROL BERM TO BE STAKED WITH LIVE WILLOW STAKES PER PLAN AND DETAILS.
- WHERE EXISTING ROCKERIES ARE PRESENT, REMOVE ROCKS AS NECESSARY TO PLACE LOGS. BANK LOGS AND ROOTWADS SHALL BE PLACED WATERWARD OF ROCKERY WITHOUT DISTURBING THE ROCKERY. REVENTMENT LOGS AND SOME FALLEN TREES SHALL REQUIRE REMOVAL OF SOME ROCKS FROM THE ROCKERIES. REMOVED ROCKS MAY BE RE-USED AS BALLAST ON LOGS.
- PLANT ALL AREAS AS SPECIFIED ON PLANTING PLAN. ALL AREAS TO BE PLANTED NO LATER THAN THE END OF THE FIRST DORMANT SEASON FOLLOWING COMPLETION OF GRADING. INSTALL IRRIGATION SYSTEM AS REQUIRED BY PLAN. SEE PLANTING PLAN FOR SPECIFIC NOTES.

**SPECIFICATIONS:**

- BANK LOG AS SPECIFIED FOR THIS PROJECT SHALL CONSIST OF SOUND, ROT AND DISEASE FREE, RELATIVELY STRAIGHT DOUGLAS FIR OR WESTERN RED CEDAR LOGS WITH ROOTWADS ATTACHED MIN. 16" LONG AND MIN. 12" DIAMETER AT TIP. EACH BANK LOG TO BE ATTACHED TO TWO ANCHORS (SEE BELOW) AS SHOWN ON APPROPRIATE DETAIL.
- FALLEN TREE AS SPECIFIED FOR THIS PROJECT SHALL CONSIST OF SOUND, ROT AND DISEASE FREE, RELATIVELY STRAIGHT DOUGLAS FIR OR WESTERN RED CEDAR LOGS MIN. 16" LONG AND MIN. 12" DIAMETER AT TIP, WITH ROOTWAD AND MIN. 5 BRANCHES ATTACHED. EACH FALLEN TREE TO BE ATTACHED TO TWO ANCHORS (SEE BELOW) AS SHOWN ON APPROPRIATE DETAIL.
- V-LOGS AS SPECIFIED FOR THIS PROJECT SHALL CONSIST OF SOUND, ROT AND DISEASE FREE, RELATIVELY STRAIGHT DOUGLAS FIR OR WESTERN RED CEDAR LOGS WITH ROOTWADS ATTACHED MIN. 16" LONG AND MIN. 12" DIAMETER AT TIP. EACH PAIR OF V-LOGS TO BE ATTACHED TO THREE ANCHORS (SEE BELOW) AS SHOWN ON APPROPRIATE DETAIL. WHERE V-LOGS INTERSECT, EACH LOG SHALL BE NOTCHED APPROXIMATELY LOG DIAMETER SUCH THAT THE NOTCHES FIT TOGETHER SECURELY. ANCHOR AT INTERSECTION TO BE CONNECTED TO BOTH V-LOGS.
- REVENTMENT LOG AS SPECIFIED FOR THIS PROJECT SHALL CONSIST OF SOUND, ROT AND DISEASE FREE DOUGLAS FIR OR WESTERN RED CEDAR LOGS MIN. 16" LONG AND MIN. 12" DIAMETER AT TIP. TWO OF EVERY THREE REVENTMENT LOGS SHALL HAVE ROOTWAD INTACT. EACH REVENTMENT LOG TO BE ATTACHED TO ONE ANCHOR (SEE BELOW) AS SHOWN ON APPROPRIATE DETAIL.
- ROOTWAD AS SPECIFIED FOR THIS PROJECT SHALL CONSIST OF SOUND, ROT AND DISEASE FREE DOUGLAS FIR OR WESTERN RED CEDAR ROOTWAD MIN. 16" DIAMETER 3' ABOVE GROUND LINE. EACH ROOTWAD TO BE ATTACHED TO ONE ANCHOR (SEE BELOW) AS SHOWN ON APPROPRIATE DETAIL.
- ANCHORS AS SPECIFIED FOR THIS PROJECT SHALL CONSIST OF MANTA RAY NR-3 EARTH ANCHORS OR EQUIVALENT. ANCHORS TO BE DRIVEN MINIMUM 4 FEET INTO GROUND AT AN ANGLE APPROXIMATELY 30° FROM VERTICAL AIMED AWAY FROM THE CENTER OF THE CHANNEL AND UPSTREAM. ALL ANCHORS SHALL BE LOAD TESTED TO MIN. 12,000 LBS, WHICH IS SUFFICIENT FORCE TO ANCHOR LOG ENTIRELY SUBMERGED IN A FLOW OF 10 FEET PER SECOND, WITH A WATER FACTOR OF 2. IF NR-3 ANCHORS ARE UNABLE TO ACHIEVE SPECIFIED LOAD RATING, THEN A LARGER ANCHOR SHALL BE SUBSTITUTED THAT MEETS SPECIFIED LOAD RATING. ALTERNATIVELY, IF NR-3 ANCHORS ARE UNABLE TO BE DRIVEN TO DESIRED LEVEL, A SMALLER ANCHOR SHALL BE USED AND SET TO THE SAME LOAD RATING.
- CHAIN AS SPECIFIED FOR THIS PROJECT SHALL CONSIST OF 5/16" GRADE 40 GALVANIZED CHAIN SECURED WITH SHACKLES OR OTHER APPROVED DEVICE RATED TO PERMANENTLY HOLD THE SAME LOAD AS SPECIFIED FOR THE ANCHOR.
- COIR AS SPECIFIED FOR THIS PROJECT SHALL BE BIOD-MAT 90 (ROLANKA INDUSTRIES, 800-760-3215) OR EQUAL, INSTALLED PER MANUFACTURERS RECOMMENDATIONS FOR BIOENGINEERED STREAMBANK RESTORATION.
- TOPSOIL AS SPECIFIED FOR THIS PROJECT SHALL BE OBTAINED FROM A COMMERCIAL TOPSOIL PROVIDER, AND IS SUBJECT TO APPROVAL BY THE STREAM RESTORATION SPECIALIST.

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES ACCORDINGLY



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1410 Market Street  
Kirkland, WA 98033  
425.822.5242 Fax: 425.827.8156  
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CLIENT  
**BILL WEINSTEIN**

ADDRESS  
75 SKAGIT KEY  
BELLEVUE,  
WASHINGTON 98008

TITLE  
**COAL CREEK  
SALMON CHANNEL  
ENHANCEMENT  
PLAN**

JOB NUMBER  
**050520**

SHEET NUMBER  
**C57 OF 7**

NO DATE	ISSUE
1	PROJ. HANDBOOK SET
2	ISSUES REVIEW SET
3	36/06 PERMIT SET

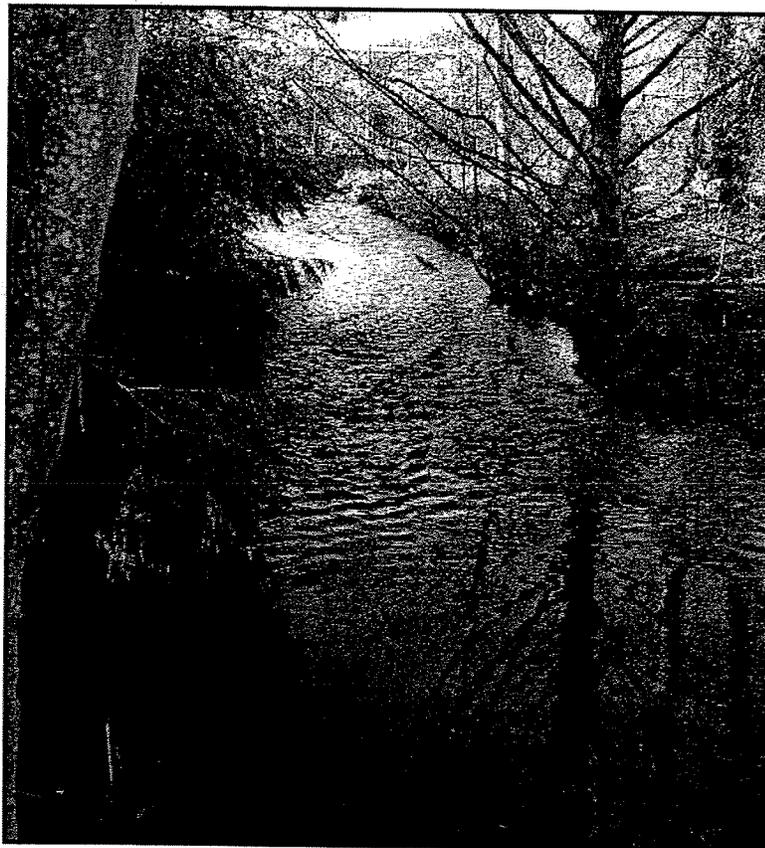
PROJECT NUMBER: 01  
DESIGNED: [ ]  
CHECKED: [ ]  
FILED: [ ]

## **Appendix B**

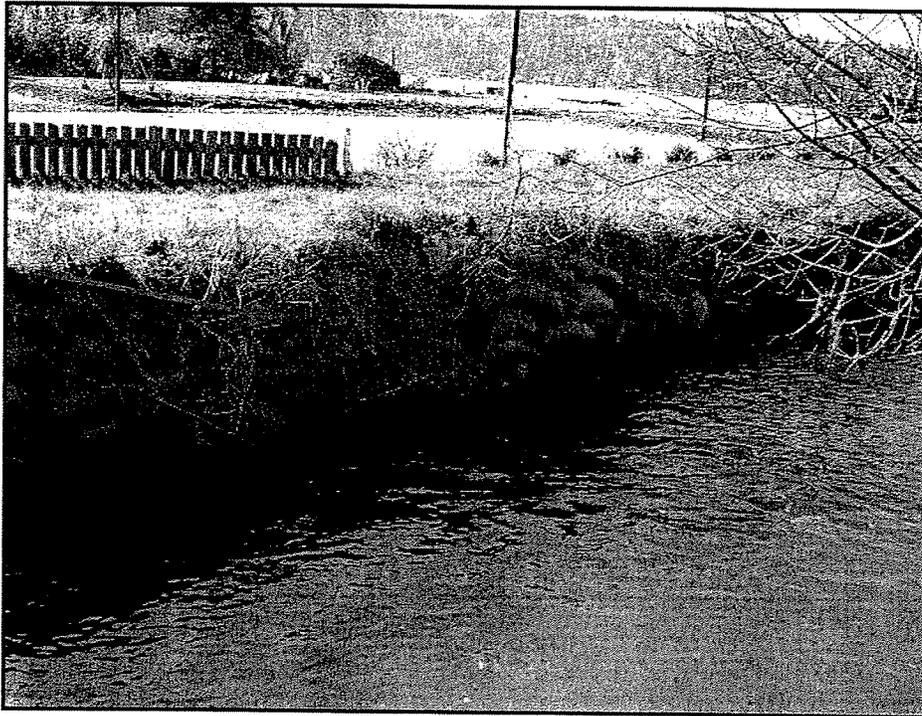
### **PROJECT AREA PHOTOS**



Culvert under Skagit Key, upstream end of the project facing upstream. 75 Skagit Key is to the left and 73 Skagit Key is to the right.



View of Coal Creek, facing downstream from Skagit Key.



Sandbag berm on 73 Skagit Key (left bank) proposed for replacement with coir-wrapped topsoil staked with willows.



View of Coal Creek delta, facing northeast.

**AGENCY USE ONLY**

Agency Reference #:

Date Received:

Circular

Govt. or agency)

# Attachment F

## JOINT AQUATIC RESOURCES PERMIT APPLICATION FORM (JARPA)

(for use in Washington State)

**PLEASE TYPE OR PRINT IN BLACK INK**



Application for a Fish Habitat Enhancement Project per requirements of RCW 77.55.290. You must submit a copy of this completed JARPA application form and the (Fish Habitat Enhancement JARPA Addition) to your local Government Planning Department and Washington Department of Fish & Wildlife Area Habitat Biologist on the same day.

**NOTE: LOCAL GOVERNMENTS – You must submit any comments on these projects to WDFW within 15 working days.**

Based on the instructions provided, I am sending copies of this application to the following: *(check all that apply)*

Local Government for shoreline:  Substantial Development  Conditional Use  Variance  Exemption  Revision  
 Floodplain Management  Critical Areas Ordinance

Washington Department of Fish and Wildlife for HPA (Submit 3 copies to WDFW Region)

Washington Department of Ecology for 401 Water Quality Certification (to Regional Office-Federal Permit Unit)

Washington Department of Natural Resources for Aquatic Resources Use Authorization Notification

Corps of Engineers for:  Section 404  Section 10 permit

Coast Guard for General Bridge Act Permit

For Department of Transportation projects only: This project will be designed to meet conditions of the most current Ecology/Department of Transportation Water Quality Implementing Agreement

**SECTION A - Use for all permits covered by this application. Be sure to ALSO complete Section C (Signature Block) for all permit applications.**

1. APPLICANT  
William Weinstein

MAILING ADDRESS  
73 Skagit Key, Bellevue, WA 98006

WORK PHONE (206) 269-3490	E-MAIL ADDRESS wsw@wlegal.com	HOME PHONE	FAX # (206) 269-3489
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*If an agent is acting for the applicant during the permit process, complete #2. Be sure agent signs Section C (Signature Block) for all permit applications*

2. AUTHORIZED AGENT  
The Watershed Company ATTN: Amy Myers

MAILING ADDRESS  
1410 Market Street, Kirkland, WA 98033

WORK PHONE (425) 822-5242	E-MAIL ADDRESS amyers@watershedco.com	HOME PHONE	FAX # 425-827-8136
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3. RELATIONSHIP OF APPLICANT TO PROPERTY:  OWNER  PURCHASER  LESSEE  OTHER:

4. NAME, ADDRESS, AND PHONE NUMBER OF PROPERTY OWNER(S), IF OTHER THAN APPLICANT: N/A

5. LOCATION (STREET ADDRESS, INCLUDING CITY, COUNTY AND ZIP CODE, WHERE PROPOSED ACTIVITY EXISTS OR WILL OCCUR)  
73 and 75 Skagit Key, Bellevue, WA 98006

LOCAL GOVERNMENT WITH JURISDICTION (CITY OR COUNTY) City of Bellevue

WATERBODY YOU ARE WORKING IN Coal Creek/Lake Washington

IS THIS WATERBODY ON THE 303(d) LIST? YES  NO

IF YES, WHAT PARAMETER(S)? Fecal coliform, pH, temperature, DO.

[http://www.ecy.wa.gov/programs/wq/links/impaired\\_wtrs.html](http://www.ecy.wa.gov/programs/wq/links/impaired_wtrs.html) WEBSITE FOR 303(d) LIST

SHORELINE DESIGNATION Residential	DNR STREAM TYPE, IF KNOWN Type 1
--------------------------------------	-------------------------------------

1/4 SECTION NE	SECTION 17	TOWNSHIP 24N	RANGE 5E	GOVERNMENT LOT	ZONING DESIGNATION Suburban Residential (R-2.5)	TAX PARCEL NO: 6065310400 / 6065310410
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LATITUDE & LONGITUDE: N47.57326, W122.18998

bucket mounted on a barge.

- 6) Where sandbags are present remove from site. Construct flood-control berm in place of sandbags, and to the same elevation as the sandbags. Depending on the extent of the existing sandbags the flood control berm may need to be constructed as multiple layers or "lifts" of coir-wrapped topsoil. Each lift to be a maximum of 1 foot high. Face and top of flood control berm to be staked with live willow stakes per plan and details.
- 7) Where existing rockeries are present, remove rocks as necessary to place logs. Bank logs and rootwads shall be placed waterward of rockery without disturbing the rockery. Revetment logs and some fallen trees shall require removal of some rocks from the rockeries. Removed rocks may be re-used as ballast on logs.

Note: a pedestrian bridge between 73 and 75 Skagit Key will also be constructed (design pending). The bridge does not include any in-water work and the bridge footings will be outside the floodplain.

PREPARATION OF DRAWINGS: SEE SAMPLE DRAWINGS AND GUIDANCE FOR COMPLETING THE DRAWINGS. **ONE SET OF ORIGINAL OR GOOD QUALITY REPRODUCIBLE DRAWINGS MUST BE ATTACHED.** NOTE: APPLICANTS ARE ENCOURAGED TO SUBMIT PHOTOGRAPHS OF THE PROJECT SITE, BUT THESE DO NOT SUBSTITUTE FOR DRAWINGS. **THE CORPS OF ENGINEERS AND COAST GUARD REQUIRE DRAWINGS ON 8-1/2 X 11 INCH SHEETS. LARGER DRAWINGS MAY BE REQUIRED BY OTHER AGENCIES.**

7b. DESCRIBE THE PURPOSE OF THE PROPOSED WORK AND WHY YOU WANT OR NEED TO PERFORM IT AT THE SITE. PLEASE EXPLAIN ANY SPECIFIC NEEDS THAT HAVE INFLUENCED THE DESIGN.

The impetus for this project is derived from sedimentation impacts to the project reach of Coal Creek as a result of actions upstream. In 2004, the applicant reached a legal agreement with the City of Bellevue and King County regarding compensation of applicant expenses to 1) construct a flood-control berm on the south bank of Coal Creek (73 Skagit Key), and 2) "construct and maintain an environmentally beneficial salmon enhancement channel at the mouth of Coal Creek to assist in salmon passage across the Coal Creek delta."

7c. DESCRIBE THE POTENTIAL IMPACTS TO CHARACTERISTIC USES OF THE WATER BODY. THESE USES MAY INCLUDE FISH AND AQUATIC LIFE, WATER QUALITY, WATER SUPPLY, RECREATION, and AESTHETICS. IDENTIFY PROPOSED ACTIONS TO AVOID, MINIMIZE, AND MITIGATE DETRIMENTAL IMPACTS, AND PROVIDE PROPER PROTECTION OF FISH AND AQUATIC LIFE. IDENTIFY WHICH GUIDANCE DOCUMENTS YOU HAVE USED. ATTACH A SEPARATE SHEET IF ADDITIONAL SPACE IS NEEDED.

#### Direct Effects on Salmonids

1. Water Quality (substrate disturbance, discharge of waste products, and turbid runoff from disturbed uplands):  
Excavation and other grading actions over limited areas of the delta, along the streambed, and on the streambanks, propwash from direct overwater use or grounding of the barge, and turbid runoff from upland disturbance during implementation of the planting plan could produce temporary, localized sediment plumes that would dissipate following cessation of activity. In addition, potential exists for hazardous or toxic wastes or other products to be unintentionally released into the water as a result of a spill or other equipment failure. Otherwise, the proposed project would not create and/or cause hazardous or toxic wastes or other products to be released into the water. Construction would be completed using a barge-mounted crane as well as land-based heavy equipment such as trackhoes.  
  
To minimize construction impacts associated with increased turbidity during construction, the following timing restrictions and conditions are proposed:
  - a) In-water construction activity would only occur from 16 July through 31 July for protection of fish and wildlife.
  - b) Erosion control and spill-prevention measures would be in place prior to commencement of construction, and would be maintained throughout the construction period.
  - c) To prevent siltation, stream flows would be routed around certain project areas during construction, depending on the type and extent of work involved. Fish would be captured and safely removed as necessary from those localized project areas where in-stream work is required.
  - d) Prior to commencement of excavation, a sedimentation control curtain would be installed around the work area.
  - e) In-lake construction shall be performed from a barge or workboat.
  - f) All construction debris shall be properly disposed of on land in such a manner that it cannot enter into the waterway or cause water quality degradation (Section 13, Rivers and Harbors Act).
  - g) Erosion and sediment control measures would be implemented as appropriate during and following installation of the proposed plantings, including measures for both the short-term and permanent stabilization of exposed soils, such as silt fence or erosion-control mulch.

Construction of the proposed project is anticipated to take two weeks. Studies investigating the effects of construction-related turbidity on salmonids in a lacustrine environment have not been located. Turbidity is generally considered an undesirable condition for salmonids, as exposure to turbid water can result in lethal and sublethal effects. However, localized temporary turbidity from an individual construction activity would not represent a permanent sediment source and would not produce conditions of chronic exposure, but exposure could be acute. Considering that the turbidity produced by construction activity would be localized and temporary, the most probable impact on juvenile salmonids would be a behavior modification (avoidance response) rather than injury or reduction in growth potential. An avoidance response could expose juvenile salmon to increased predation or force them away from preferred foraging areas.

The most effective strategy for minimizing or eliminating potential construction-related impacts to salmonids would be to restrict construction to periods when the presence of bull trout, chinook salmon, or coho salmon is improbable. The

IF YES:

A. IMPACTED AREA IN ACRES: <.003 acre

B. HAS A DELINEATION BEEN COMPLETED? IF YES, PLEASE SUBMIT WITH APPLICATION.  YES  NO

C. HAS A WETLAND REPORT BEEN PREPARED? IF YES, PLEASE SUBMIT WITH APPLICATION.  YES  NO

D. TYPE AND COMPOSITION OF FILL MATERIAL (E.G., SAND, ETC.): Material removed from the wetland edge adjacent to the stream to place a few stream enhancement logs would be replaced around the logs after installation.

E. MATERIAL SOURCE: On-site soils.

F. LIST ALL SOIL SERIES (TYPE OF SOIL) LOCATED AT THE PROJECT SITE, & INDICATE IF THEY ARE ON THE COUNTY'S LIST OF HYDRIC SOILS. SOILS INFORMATION CAN BE OBTAINED FROM THE NATURAL RESOURCES CONSERVATION SERVICE (NRCS): Briscot silt loam (Br), hydric

G. WILL PROPOSED ACTIVITY CAUSE FLOODING OR DRAINING OF WETLANDS? IF YES, IMPACTED AREA IS \_\_\_ ACRES OF DRAINED WETLANDS.  YES  NO

NOTE: If your project will impact greater than 1/4 of an acre of wetland, submit a mitigation plan to the Corps and Ecology for approval along with the JARPA form  
 NOTE: a 401 water quality certification will be required from Ecology in addition to an approved mitigation plan if your project impacts wetlands that are: a) greater than 1/2 acre in size, or b) tidal wetlands or wetlands adjacent to tidal water. Please submit the JARPA form and mitigation plan to Ecology for an individual 401 certification if a) or b) applies.

12. STORMWATER COMPLIANCE FOR NATIONWIDE PERMITS ONLY: N/A  
 THIS PROJECT IS (OR WILL BE) DESIGNED TO MEET ECOLOGY'S MOST CURRENT STORMWATER MANUAL, OR AN ECOLOGY APPROVED LOCAL STORMWATER MANUAL  YES  NO  
 IF YES - WHICH MANUAL WILL YOUR PROJECT BE DESIGNED TO MEET?  
 IF NO - FOR CLEAN WATER ACT SECTION 401 AND 404 PERMITS ONLY - PLEASE SUBMIT TO ECOLOGY FOR APPROVAL, ALONG WITH THIS JARPA APPLICATION, DOCUMENTATION THAT DEMONSTRATES THE STORMWATER RUNOFF FROM YOUR PROJECT OR ACTIVITY WILL COMPLY WITH THE WATER QUALITY STANDARDS, WAC 173.201(A)

13. WILL EXCAVATION OR DREDGING BE REQUIRED IN WATER OR WETLANDS? IF YES:  YES  NO

A. VOLUME: ~66 (CUBIC YARDS) / AREA <0.003 (ACRES)

B. COMPOSITION OF MATERIAL TO BE REMOVED: Existing streambed substrate materials (gravel, sands, silts) will be removed to excavate pools for placement of in-stream/in-lake logs (35 cy). The sandbag berm will be removed (31 cy).

C. DISPOSAL SITE FOR EXCAVATED MATERIAL: Approved upland facility

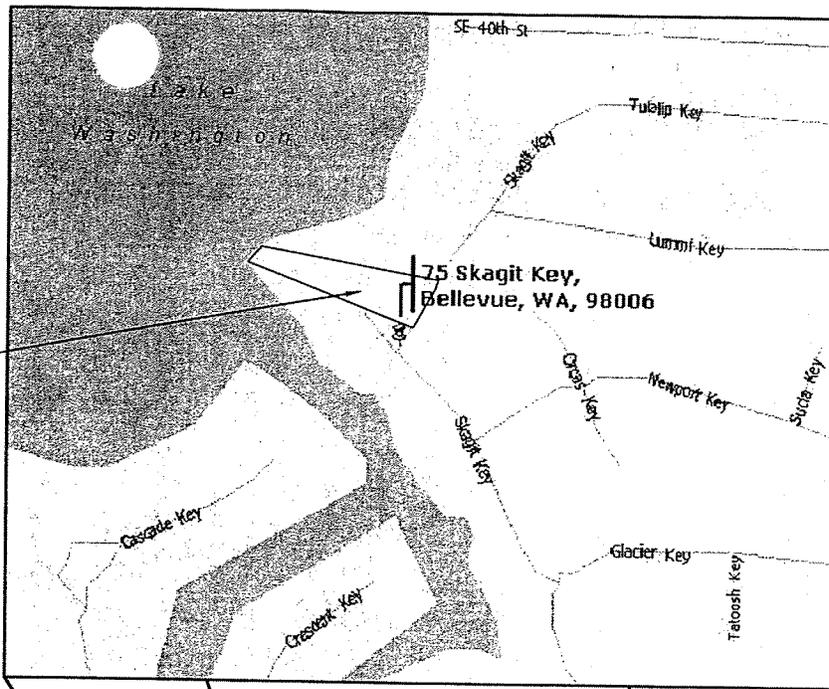
D. METHOD OF DREDGING: Barge-mounted crane equipped with a clamshell bucket (lake work) or small land-based excavator (stream work)

14. HAS THE STATE ENVIRONMENTAL POLICY ACT (SEPA) BEEN COMPLETED?  YES  NO  
 SEPA LEAD AGENCY: City of Bellevue SEPA DECISION: DNS, MDNS, EIS, ADOPTION, EXEMPTION Pending DECISION DATE (END OF COMMENT PERIOD): Pending  
 SUBMIT A COPY OF YOUR SEPA DECISION LETTER TO WDFW AS REQUIRED FOR A COMPLETE APPLICATION

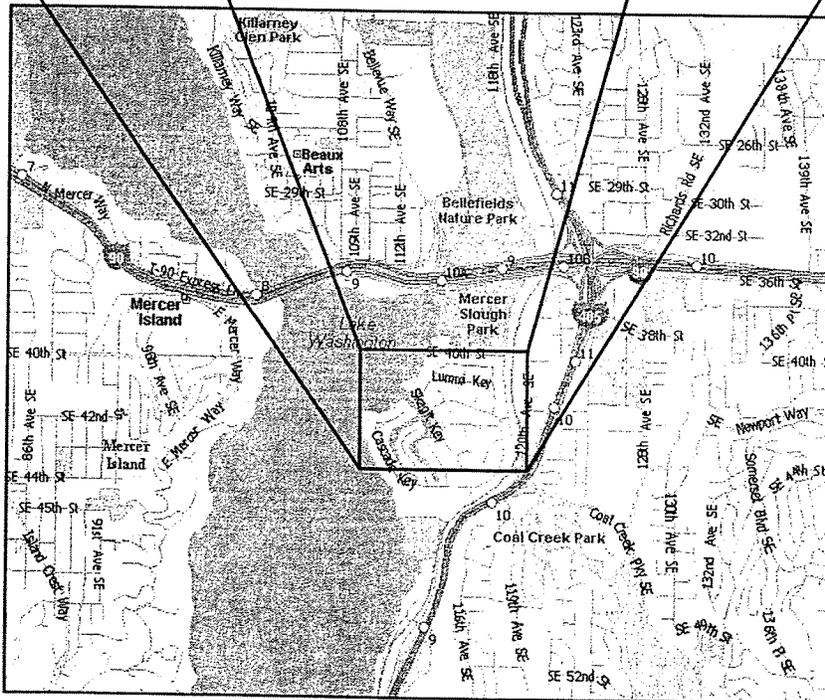
15. LIST OTHER APPLICATIONS, APPROVALS, OR CERTIFICATIONS FROM OTHER FEDERAL, STATE OR LOCAL AGENCIES FOR ANY STRUCTURES, CONSTRUCTION, DISCHARGES, OR OTHER ACTIVITIES DESCRIBED IN THE APPLICATION (I.E., PRELIMINARY PLAT APPROVAL, HEALTH DISTRICT APPROVAL, BUILDING PERMIT, SEPA REVIEW, FEDERAL ENERGY REGULATORY COMMISSION LICENSE (FERC), FOREST PRACTICES APPLICATION, ETC.) ALSO INDICATE WHETHER WORK HAS BEEN COMPLETED AND INDICATE ALL EXISTING WORK ON DRAWINGS.  
 NOTE: FOR USE WITH CORPS NATIONWIDE PERMITS, IDENTIFY WHETHER YOUR PROJECT HAS OR WILL NEED AN NPDES PERMIT FOR DISCHARGING WASTEWATER AND/OR STORMWATER.

TYPE OF APPROVAL	ISSUING AGENCY	IDENTIFICATION NO.	DATE OF APPLICATION	DATE APPROVED	COMPLETED?
Shoreline Substantial Development (for project components not related to stream restoration)					
SEPA					

16. HAS ANY AGENCY DENIED APPROVAL FOR THE ACTIVITY YOU'RE APPLYING FOR OR FOR ANY ACTIVITY DIRECTLY RELATED TO THE ACTIVITY DESCRIBED HEREIN?  YES  NO  
 IF YES, EXPLAIN:



SITE LOCATION



VICINITY MAP  
SCALE: NTS



PRESENTED BY:



The Watershed Company

1410 Market Street  
Kirkland, WA 98033

425.822.5242 Fax: 425.827.8136

PURPOSE: IMPROVE SALMON HABITAT & FISH  
PASSAGE CONDITIONS

DATUM: NGVD 29

ADJACENT PROPERTY OWNERS:

1. MARC KRIZ - 71 SKAGIT KEY
2. RICHARD LOMAS - 77 SKAGIT KEY

APPLICANT: WILLIAM WEINSTEIN

REFERENCE #: 2006-

SITE LOCATION ADDRESS:

73 & 75 SKAGIT KEY  
BELLEVUE WA 98007

PROPOSED: REPLACE SANDBAG FLOOD-CONTROL  
BERM WITH COIR-WRAPPED SOIL LIFTS & INSTALL  
LOG STRUCTURES

IN: COAL CREEK & LAKE WASHINGTON

AT: BELLEVUE

COUNTY: KING

STATE: WA

SHEET: 1 OF 10

DATE: MARCH 13, 2006

LAKE WASHINGTON

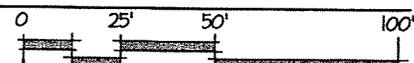
MATCHLINE

LAKE WASHINGTON ORDINARY HIGH WATER LOCATED BY TRIAD ON 10/26/05  
ELEV. = 18.6' (EQUIVALENT TO USACE OHWM ELEVATION OF 21.8' (NGVD 29))



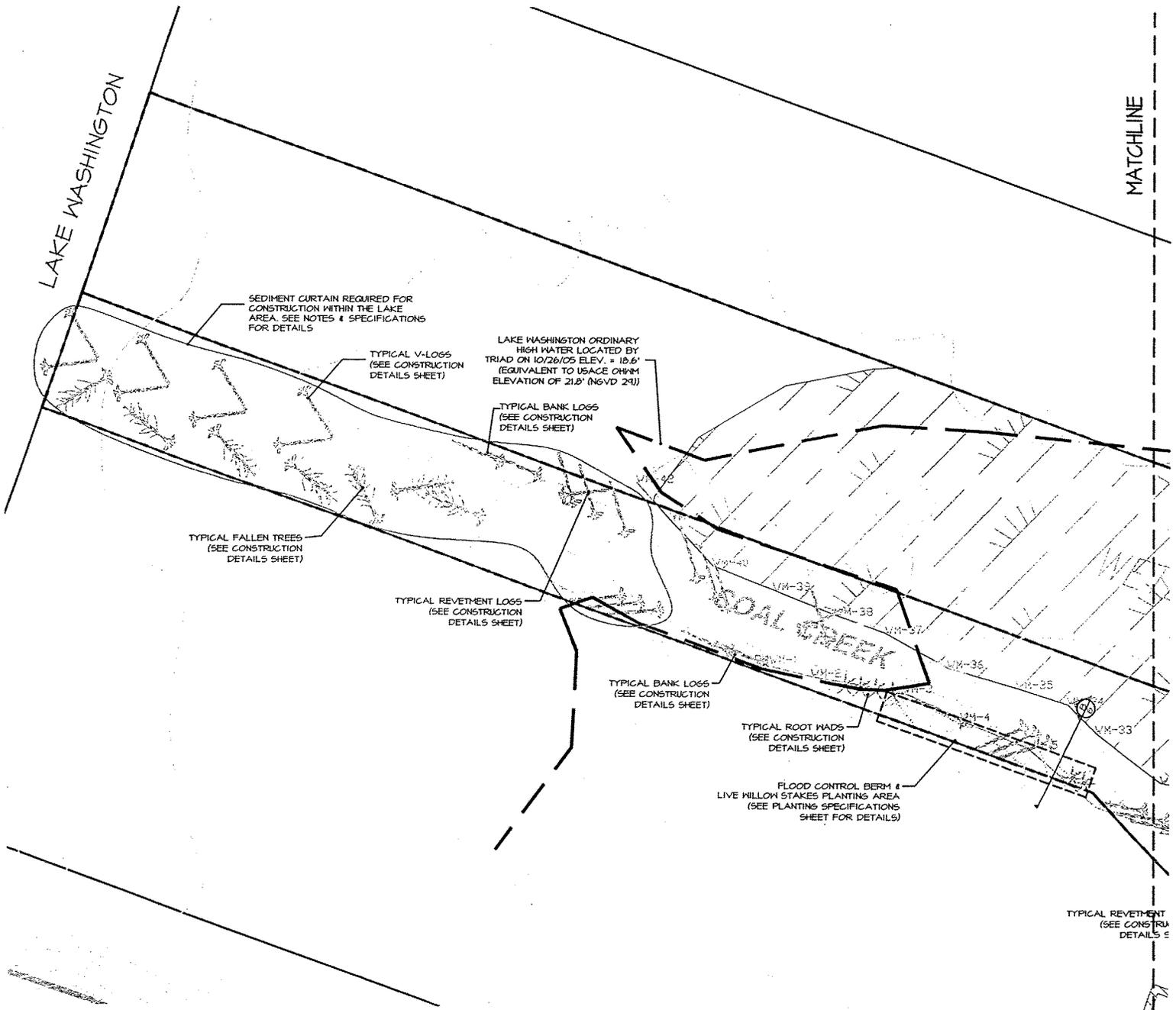
### EXISTING CONDITION SHEET 1

SCALE: 1" = 50' - 0"



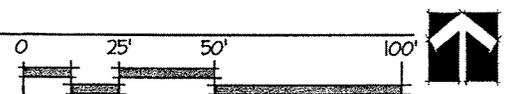
<b>PURPOSE:</b> IMPROVE SALMON HABITAT & FISH PASSAGE CONDITIONS	<b>APPLICANT:</b> WILLIAM WEINSTEIN	<b>PROPOSED:</b> REPLACE SANDBAG FLOOD-CONTROL BERM WITH COIR-WRAPPED SOIL LIFTS & INSTALL LOG STRUCTURES
<b>DATUM:</b> NGVD 29	<b>REFERENCE #:</b> 2006-	<b>IN:</b> COAL CREEK & LAKE WASHINGTON
<b>ADJACENT PROPERTY OWNERS:</b> 1. MARC KRIZ - 71 SKAGIT KEY 2. RICHARD LOMAS - 77 SKAGIT KEY	<b>SITE LOCATION ADDRESS:</b> 73 & 75 SKAGIT KEY BELLEVUE WA 98007	<b>AT:</b> BELLEVUE <b>COUNTY:</b> KING <b>STATE:</b> WA <b>SHEET:</b> 3 OF 10 <b>DATE:</b> MARCH 13, 2006

**NOTE:** ALL LOG POSITIONS WERE SURVEYED VIA GPS TO SIMULATE FIELD CONDITIONS. HOWEVER, DUE TO THE ACTIVE ENVIRONMENT IN WHICH THE WORK IS PROPOSED, SITE CONDITIONS MAY HAVE CHANGED. THEREFORE ALL LOG LOCATIONS ARE APPROXIMATE AND MAY BE ADJUSTED DURING CONSTRUCTION TO SUIT NEW CONDITIONS.

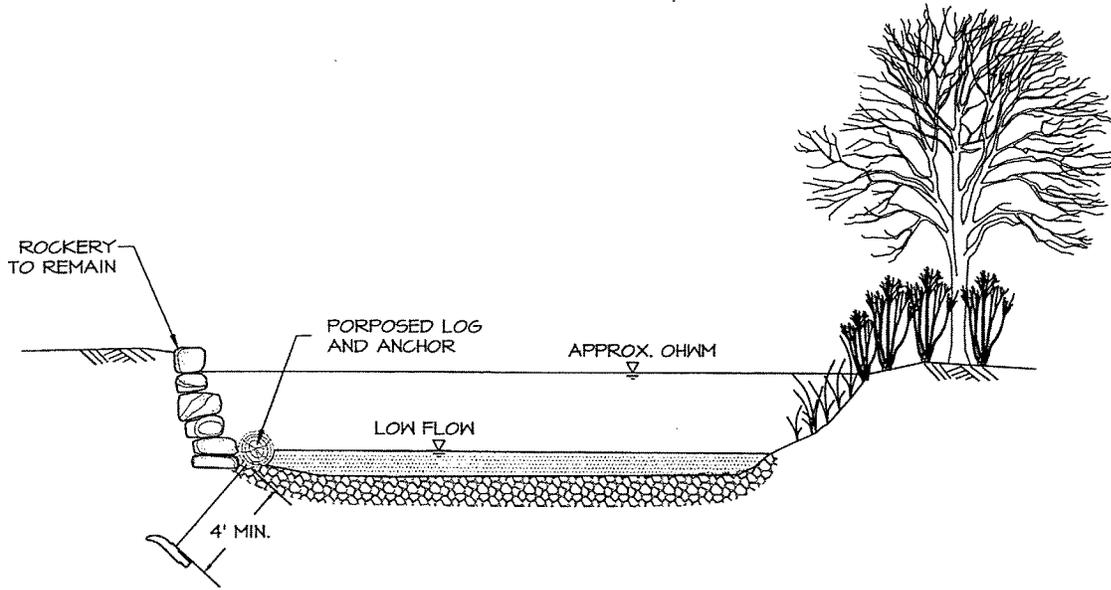


# SITE PLAN SHEET 1

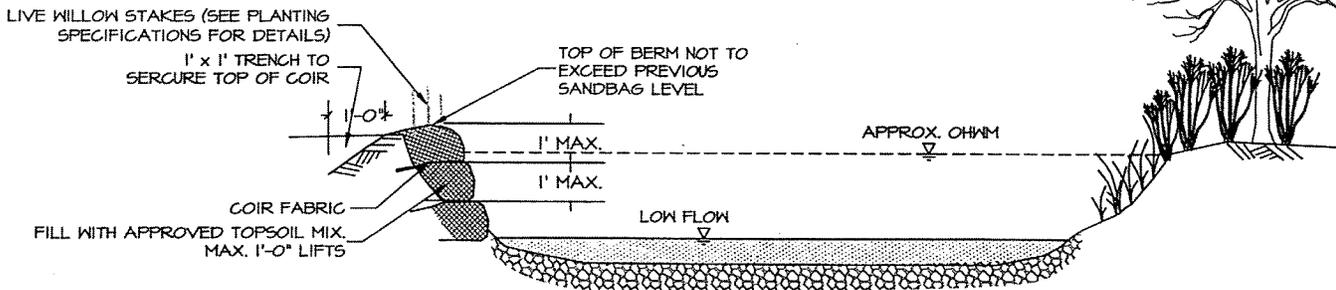
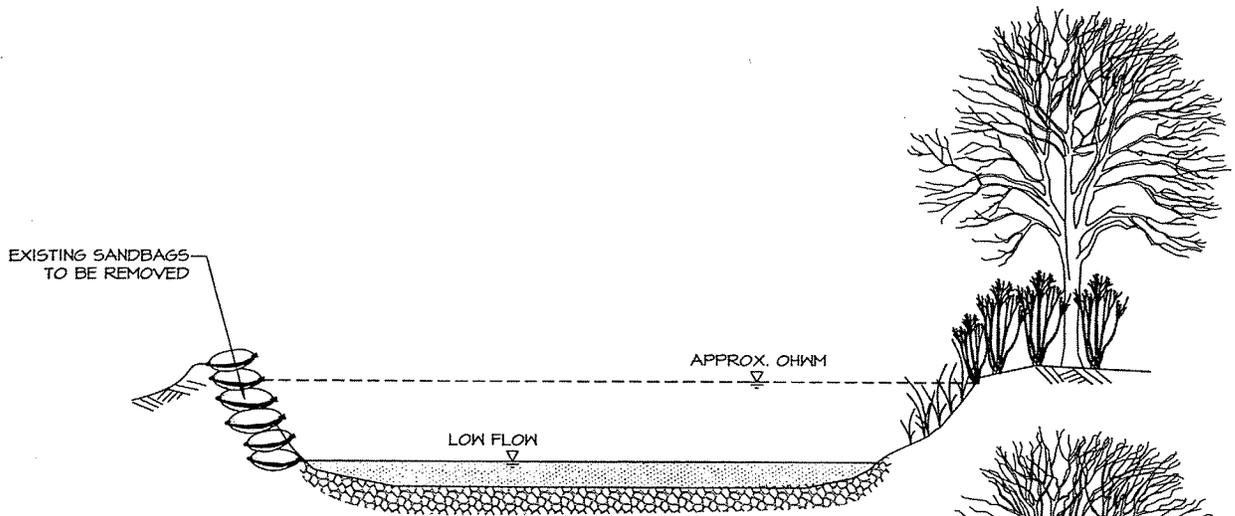
SCALE: 1" = 50' - 0"



<p><b>PURPOSE:</b> IMPROVE SALMON HABITAT &amp; FISH PASSAGE CONDITIONS</p> <p><b>DATUM:</b> NGVD 29</p> <p><b>ADJACENT PROPERTY OWNERS:</b>          1. MARC KRIZ - 71 SKAGIT KEY          2. RICHARD LOMAS - 77 SKAGIT KEY</p>	<p><b>APPLICANT:</b> WILLIAM WEINSTEIN</p> <p><b>REFERENCE #:</b> 2006-</p> <p><b>SITE LOCATION ADDRESS:</b>          73 &amp; 75 SKAGIT KEY          BELLEVUE WA 98007</p>	<p><b>PROPOSED:</b> REPLACE SANDBAG FLOOD-CONTROL BERM WITH COIR-WRAPPED SOIL LIFTS &amp; INSTALL LOG STRUCTURES</p> <p><b>IN:</b> COAL CREEK &amp; LAKE WASHINGTON</p> <p><b>AT:</b> BELLEVUE</p> <p><b>COUNTY:</b> KING      <b>STATE:</b> WA</p> <p><b>SHEET:</b> 5 OF 10</p> <p><b>DATE:</b> MARCH 13, 2006</p>
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**A** EXISTING ROCK WALL AND PROPOSED BANK LOG SECTION  
NTS



**B** FLOOD CONTROL BERM SECTION  
NTS

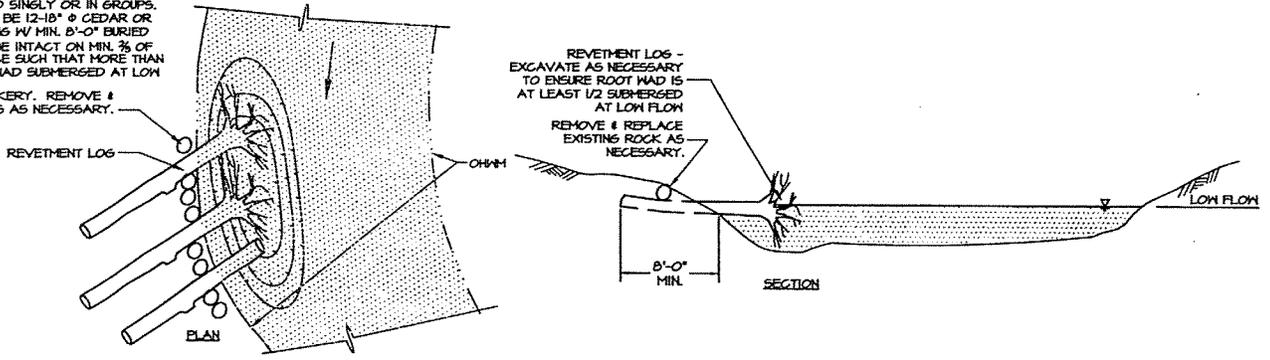
## CONSTRUCTION DETAILS SHEET I

<b>PURPOSE:</b> IMPROVE SALMON HABITAT & FISH PASSAGE CONDITIONS	<b>APPLICANT:</b> WILLIAM WEINSTEIN	<b>PROPOSED:</b> REPLACE SANDBAG FLOOD-CONTROL BERM WITH COIR-WRAPPED SOIL LIFTS & INSTALL LOG STRUCTURES
<b>DATUM:</b> NGVD 29	<b>REFERENCE #:</b> 2006-	<b>IN:</b> COAL CREEK & LAKE WASHINGTON
<b>ADJACENT PROPERTY OWNERS:</b> 1. MARC KRIZ - 71 SKAGIT KEY 2. RICHARD LOMAS - 77 SKAGIT KEY	<b>SITE LOCATION ADDRESS:</b> 73 & 75 SKAGIT KEY BELLEVUE WA 98007	<b>AT:</b> BELLEVUE <b>COUNTY:</b> KING <b>STATE:</b> WA <b>SHEET:</b> 7 OF 10 <b>DATE:</b> MARCH 13, 2006

**NOTES:**

- LOGS MAY BE PLACED SINGLY OR IN GROUPS.
- REVETMENT LOGS TO BE 12-18" Ø CEDAR OR FIR, A MIN. OF 12'-0" LONG W/ MIN. 8'-0" BURIED INTO BANK. ROOTS TO BE INTACT ON MIN. 2/3 OF REVETMENT LOGS. PLACE SUCH THAT MORE THAN HALF OF LOG OR ROOTWAD SUBMERGED AT LOW FLOW.

EXISTING ROCKERY. REMOVE & REPLACE ROCKS AS NECESSARY.

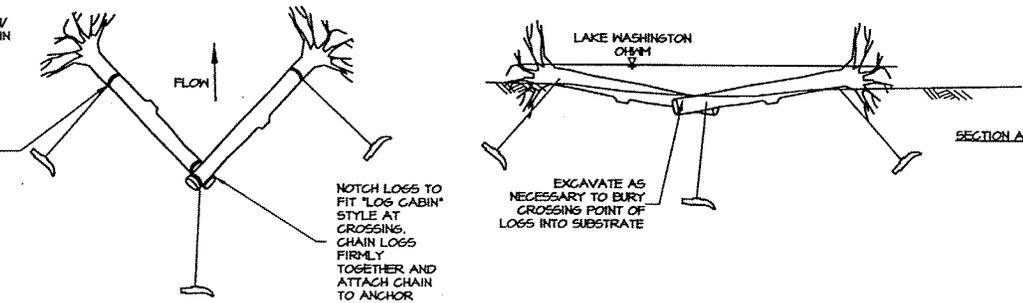


**F TYP. REVETMENT LOG INSTALLATION**

NT5

- NOTE:** V-LOGS TO BE WESTERN RED CEDAR OR DOUGLAS FIR W/ ROOTS ATTACHED MIN. 16 FEET IN LENGTH AND 12 INCHES IN DIAMETER, 16 FEET FROM ROOT END.

CHAIN LOGS W/ ATTACHED ROOTS TO MANTA RAY MR-3 ANCHOR, ONE AT EACH END, 48" MIN. INTO GROUND USING 5/16" Ø MIN. GRADE 40 GALV. STEEL CHAIN MAKING TWO COMPLETE WRAPS AROUND LOG AND SECURE W/ SHACKLES OR OTHER APPROVED CONNECTION DEVICE RATED TO PERMANENTLY HOLD THE SAME LOAD AS SPECIFIED FOR THE ANCHOR. SCORE LOG TO RECESS CHAIN.

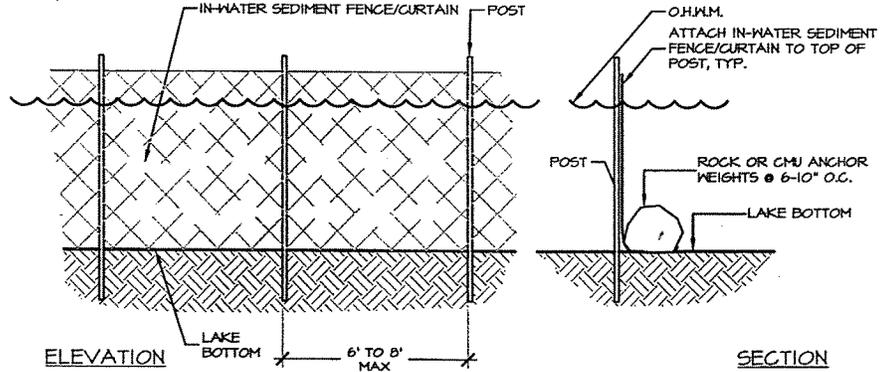
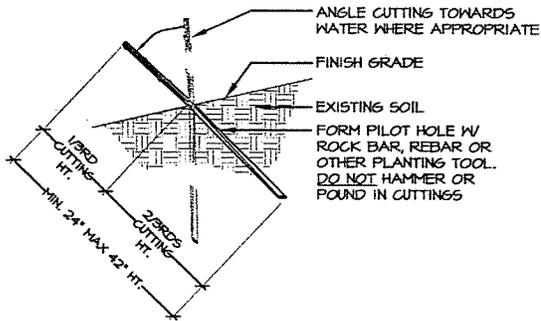


**G TYP. V-LOGS INSTALLATION**

NT5

**NOTES:**

- CUTTING SHOULD BE ANGLE CUT (45°) AT THE BASE AND PERPENDICULAR CUT JUST ABOVE A NODE (BUD)
- INSTALL CUTTING A MIN. OF 2/3RDS INTO SOIL, 18" O.C.
- NODES (BUDS) MUST BE POINTING UP
- FIRM UP SOIL AROUND INSTALLED CUTTING
- WATER CUTTINGS AFTER PLANTING
- INSTALL IRRIGATION SYSTEM



**H TYP. LIVE STAKE PLANTING**

NT5

**I SEDIMENT CURTAIN**

NT5

**CONSTRUCTION DETAILS SHEET III**

<p><b>PURPOSE:</b> IMPROVE SALMON HABITAT &amp; FISH PASSAGE CONDITIONS</p> <p><b>DATUM:</b> NGVD 29</p> <p><b>ADJACENT PROPERTY OWNERS:</b>          1. MARC KRIZ - 71 SKAGIT KEY          2. RICHARD LOMAS - 77 SKAGIT KEY</p>	<p><b>APPLICANT:</b> WILLIAM WEINSTEIN</p> <p><b>REFERENCE #:</b> 2006-</p> <p><b>SITE LOCATION ADDRESS:</b>          73 &amp; 75 SKAGIT KEY          BELLEVUE WA 98007</p>	<p><b>PROPOSED:</b> REPLACE SANDBAG FLOOD-CONTROL BERM WITH COIR-WRAPPED SOIL LIFTS &amp; INSTALL LOG STRUCTURES</p> <p><b>IN:</b> COAL CREEK &amp; LAKE WASHINGTON</p> <p><b>AT:</b> BELLEVUE</p> <p><b>COUNTY:</b> KING                      <b>STATE:</b> WA</p> <p><b>SHEET:</b> 9 OF 10</p> <p><b>DATE:</b> MARCH 13, 2006</p>
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# The Watershed Company

13 October 2005

## Attachment G

Bill Weinstein  
73 Skagit Key  
Bellevue, WA 98008

Re: Wetland Delineation and Stream Location Survey

Dear Mr. Weinstein:

On 7 July 2005, Watershed Company personnel conducted a stream location and wetland delineation survey located at 73 Skagit Key as well as the vacant property to the north of 73 Skagit Key (tax parcels 606531-0400-0410) in the City of Bellevue, Washington. This letter summarizes the findings of this study and details applicatory federal, state and local wetland regulations.

The purpose of the study was to locate the Ordinary High Water Mark (OHWM) of Coal Creek, and delineate and flag the wetland north of Coal Creek.

### Methods

The subject property was screened for wetlands using methodology from both the *Washington State Wetlands Identification and Delineation Manual* (Washington Department of Ecology 1997) and the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987). Methodologies in both manuals are essentially identical. Wetland boundaries were determined on the basis of an examination of vegetation, soils, and hydrology. Areas meeting the criteria set forth in the manuals were determined to be wetland.

Five pink- and black-striped flags mark the wetland boundary (A-1 to A-7). Three data points were recorded and marked with solid pink flagging. Five pink- and black-striped flags mark the OHWM on both sides of Coal Creek (WM-1 to WM-42). Included with this letter is a sketch showing the flag and data point locations. Wetland Determination Data Sheets are also included with this letter.

### Findings

At the time of the site visit, weather conditions were clear with a high temperature of approximately 75 degrees Fahrenheit. Weather patterns have been characterized by approximately 15 percent below normal rainfall since 1 October 2004 (KOMO4.com).

Coal Creek flows in the middle of the two tax parcels and then discharges into Lake Washington. The OHWM was clear, following a distinct break in topography and erosion pattern.

An associated wetland is found north of Coal Creek and continues westward to the fringe of Lake Washington. The wetland is dominated by cattails, giant horsetail, reed canarygrass, bindweed, birdsfoot trefoil, willows, and alders.

Mr. Weinstein  
22 July 2005  
Page 3 of 3

permits may also require Washington Department of Ecology Individual 401 Water Quality Certification and Coastal Zone Management Consistency determination.

Neither the Army Corps nor the Department of Ecology regulates wetland buffers.

Please note that the findings of this letter and the delineated wetland boundary are subject to the verification and agreement of local, state and federal regulatory authorities.

Please call if you have any questions or if we can provide additional information.

Sincerely,



Hugh Mortensen  
Ecologist/PWS



Robert King  
Wetland Biologist

Enclosures



# WETLAND DETERMINATION DATA FORM

The Watershed Company - 1410 Market Str Kirkland WA 98033  
Phone: 822-5242 Fax: (425) 827-8136 www.watershedco.com

WETLAND?  YES  NO

Date: 07/07/05

Data point: DP-2

Wetland: A

Project Name: Coal Weinstein

Data point location: \_\_\_\_\_

Biologist(s): HM & RK

Do normal environmental conditions exist?  YES  NO

Has vegetation, soils &/or hydrology been significantly disturbed within the past 5 yrs? YES  NO

Stratum: T=tree, S=shrub, H=herb, V=vine

### VEGETATION

Dominant Species	Stratum	WIS	Other Species	Stratum	WIS
<i>Typha latifolia</i>	H	OBL			
<i>Phalaris arundinacea</i>	H	FACW			
<i>Convolvulus</i> sp.	H	UNK			
<i>Lotus corniculatus</i>	H	FAC			

Percent of dominant species that are FAC, FACW or OBL 100

Vegetation criteria met?  YES  NO

Notes: \_\_\_\_\_

### SOILS

Depth	Horizon	Matrix Color	Mottles (Distinct/Prominent)	Texture	Hydric Indicators:
0-6"	B	10YR 4/2	Yes	Fine sand	<input checked="" type="checkbox"/> Gleyed/Low Chroma
6-8"	B	10YR 2/1		coal sand mixture	<input type="checkbox"/> Sulfidic odor
8-10"	B	10 YR 2/1		Silty loam	<input type="checkbox"/> Histosol
					<input type="checkbox"/> Other (list in notes)

Soil Criteria Met?  YES  NO

Notes: \_\_\_\_\_

### HYDROLOGY

Surface saturation? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Primary Indicators: (1 required)	Secondary Indicators: (≥2 required)
Depth to saturation <u>0"</u>	<input type="checkbox"/> Observation of inundation	<input checked="" type="checkbox"/> Oxidized root channels
Depth of inundation _____	<input type="checkbox"/> Observation of soil saturation	<input type="checkbox"/> Water-stained leaves
Depth to free water in pit _____	<input type="checkbox"/> Water marks	<input type="checkbox"/> Local soil survey data
Flow? YES <input type="checkbox"/> NO <input type="checkbox"/>	<input type="checkbox"/> Drift lines or drainage patterns	<input type="checkbox"/> FAC-neutral test
Channel? <input type="checkbox"/> Sheet? <input type="checkbox"/>	<input type="checkbox"/> Sediment deposits	

Hydrologic Criteria Met?  YES  NO  
Recent rainfall: Very high  High  Normal  Low  Very low

Notes: \_\_\_\_\_

### WILDLIFE OBSERVATIONS AND GENERAL NOTES

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

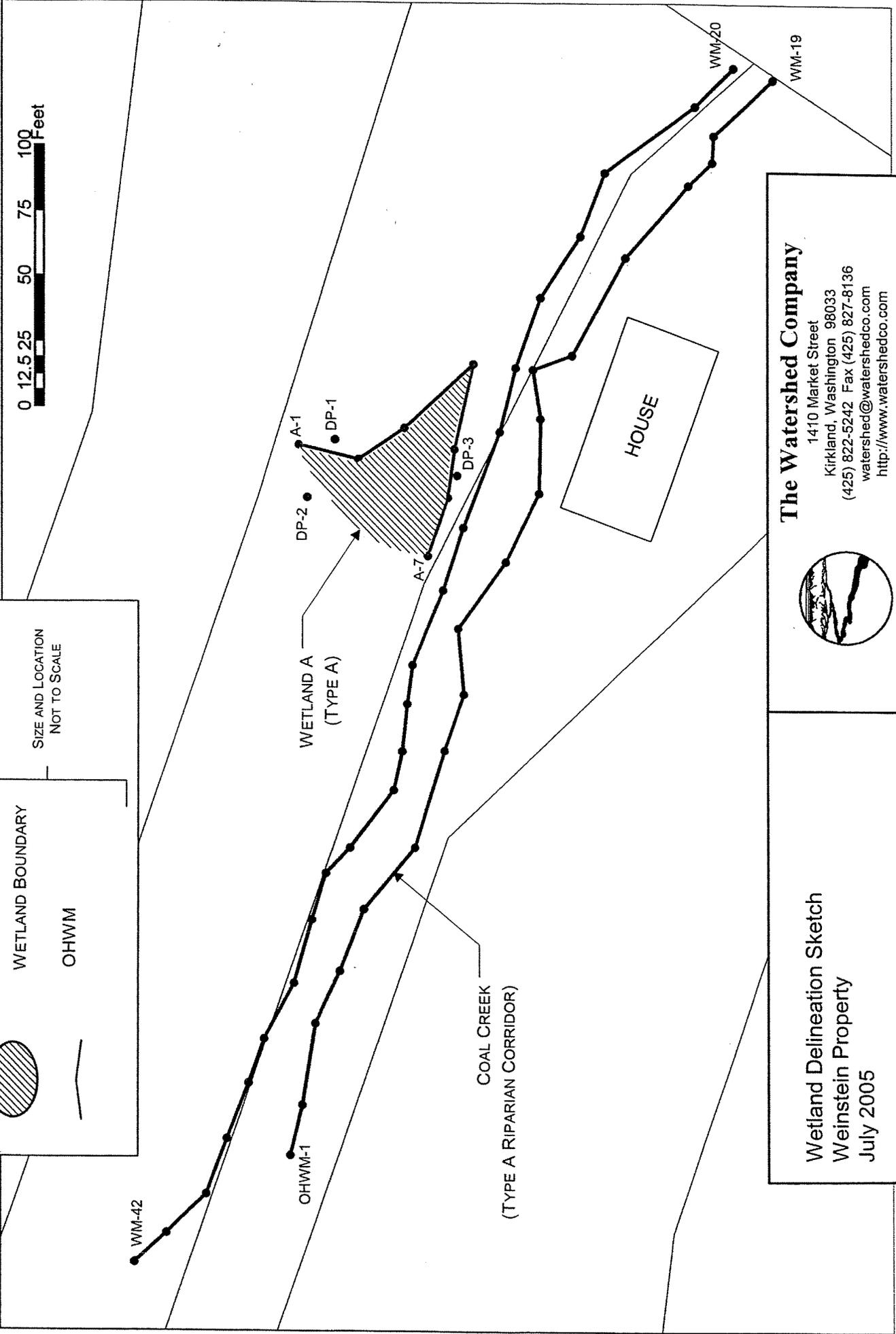


**LEGEND**

 WETLAND BOUNDARY

 OHWM

SIZE AND LOCATION NOT TO SCALE



**The Watershed Company**  
1410 Market Street  
Kirkland, Washington 98033  
(425) 822-5242 Fax (425) 827-8136  
watershed@watershedco.com  
<http://www.watershedco.com>



Wetland Delineation Sketch  
Weinstein Property  
July 2005



October 28, 2005  
ES-0245

## Attachment H

Earth Solutions NW LLC

- Geotechnical Engineering
- Construction Monitoring
- Environmental Sciences

Mr. William S. Weinstein  
2101 Fourth Avenue, Suite 900  
Mail Stop 150  
Seattle, Washington 98121

CLINT HARTWELL

(425) 391-2213 FAX

**Subject: Pin Pile Foundation Recommendations  
75 Skagit Key  
Bellevue, Washington**

(~~391~~-  
427-6925)

Dear Mr. Weinstein:

In accordance with your request, Earth Solutions NW (ESNW) has prepared this letter providing pin pile foundation recommendations for the subject residence. The purpose and scope of our geotechnical services was to observe and log two soil borings drilled at the subject site and develop soil strength criteria and recommendations to use for foundation design. We also installed one piezometer in Boring B-2 to monitor and measure near-surface groundwater elevations. We have provided recommendations for pin pile and compensating foundations in this letter.

### Project Description

The site is located within the Newport Division 3 residential subdivision along the eastern shores of Lake Washington in Bellevue, Washington. The subject site is currently vacant and will be developed with a new single-family residence. Due to the presence of approximately 55 feet of loose and compressible soils, an alternate foundation or pin piles will be installed to provide axial support for the new foundations.

### Subsurface Conditions

Two soil borings were drilled at the subject site for the purposes of identifying the bearing soil stratum. The borings were advanced to a depth of approximately 61.5 feet below existing grades. We have attached the Vicinity Map as Plate 1 and the Boring Location Map as Plate 2. Please refer to these plates for site specific information. We have also attached the Boring Logs to this report.

### **Axial Load Capacity**

Assuming the pin piles are driven to refusal, the allowable axial load capacities listed below can be used for design:

<b>Pile Diameter</b>	<b>Load Capacity*</b>	<b>Refusal Criteria (seconds/inch)</b>
3 inch	5 tons	10
4 inch	8 tons	10

(\* assumes a factor-of-safety of at least 2.0)

Refusal is generally defined as less than six inches of penetration within the above refusal criteria.

With structural loading as expected, total settlement in the range of one inch is anticipated, with differential settlement of approximately three quarters of an inch. The majority of the settlements should occur during construction, as dead loads are applied.

### **Lateral Load Capacity**

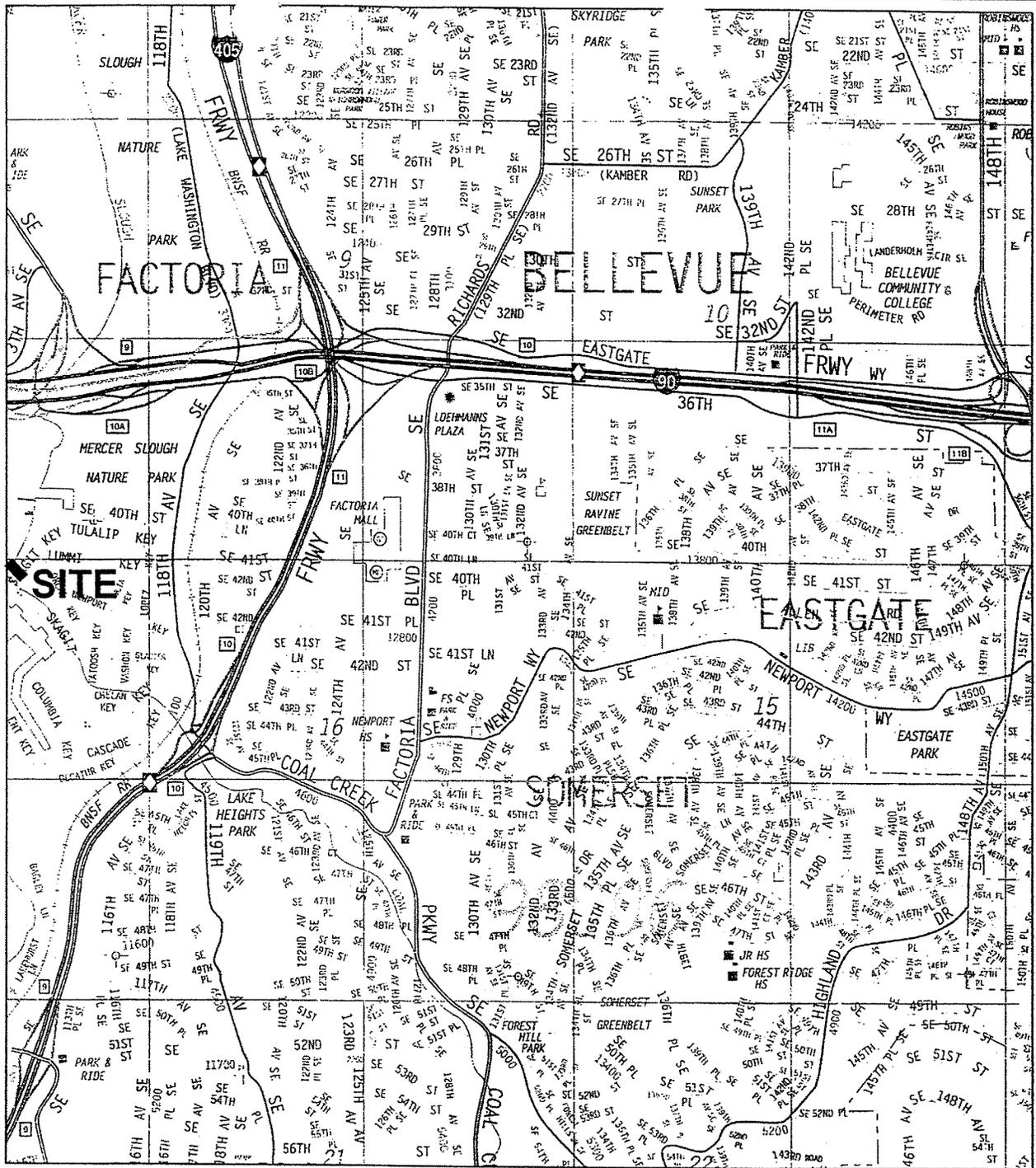
In general, lateral load capacity of pin piles is very limited and should be neglected in design. Limited lateral load capacity can be provided by passive resistance developed by grade beams, if utilized. In our opinion, lateral load capacity of the pin piles is negligible and should be assumed to be zero for design. If additional lateral load capacity is required, ESNW can review the pile design and provide batter pile recommendations, as appropriate.

An ESNW representative should observe the pin pile installation to verify the refusal criteria during the pile driving operation.

### **Compensating Foundations**

An alternative to pin pile support would be a compensating foundation system. A compensating foundation approach would consist of removing soil within the building footprint equal to the anticipated loading imparted by the new building. This typically results in a crawl-space basement. Lightweight fill may also be utilized to decrease loading of the compressible soils. Total settlements are anticipated to be in the range of one and one-half inches, and differential settlements in the range of three-quarters of an inch. If settlements in this range are not acceptable, pile supported foundations should be used.

If a compensating foundation approach will be considered for this project, ESNW can provide further recommendations upon request.



Reference:  
King County  
Map 596  
By Thomas Brothers Maps  
Dated 2006



NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.



**Earth Solutions NW LLC**

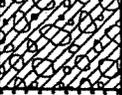
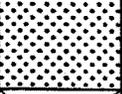
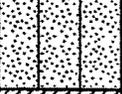
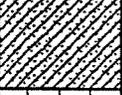
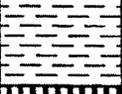
Engineering, Construction Monitoring  
and Environmental Sciences

Vicinity Map  
75 Skagit Key  
Bellevue, Washington

Drwn.	GLS	Date Nov. 2005	Proj. No.	0245
Checked	SSR	Date 11/1/05	Plate	1

# Earth Solutions N. LLC

## SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS		
			GRAPH	LETTER			
<b>COARSE GRAINED SOILS</b>  MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	<b>GRAVEL AND GRAVELLY SOILS</b>  (LITTLE OR NO FINES)	CLEAN GRAVELS		<b>GW</b>	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
		(LITTLE OR NO FINES)		<b>GP</b>	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
		GRAVELS WITH FINES		<b>GM</b>	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES		
		(APPRECIABLE AMOUNT OF FINES)		<b>GC</b>	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES		
	<b>SAND AND SANDY SOILS</b>  MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	<b>CLEAN SANDS</b>  (LITTLE OR NO FINES)	CLEAN SANDS		<b>SW</b>	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
			(LITTLE OR NO FINES)		<b>SP</b>	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES	
		<b>SANDS WITH FINES</b>  (APPRECIABLE AMOUNT OF FINES)	SANDS WITH FINES		<b>SM</b>	SILTY SANDS, SAND - SILT MIXTURES	
			(APPRECIABLE AMOUNT OF FINES)		<b>SC</b>	CLAYEY SANDS, SAND - CLAY MIXTURES	
			<b>SILTS AND CLAYS</b>  LIQUID LIMIT LESS THAN 50	SILTS AND CLAYS		<b>ML</b>	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				(LITTLE OR NO FINES)		<b>CL</b>	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
<b>SILTS AND CLAYS</b>  LIQUID LIMIT GREATER THAN 50	<b>SILTS AND CLAYS</b>  LIQUID LIMIT LESS THAN 50	SILTS AND CLAYS		<b>OL</b>	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY		
		(LITTLE OR NO FINES)		<b>MH</b>	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS		
	<b>SILTS AND CLAYS</b>  LIQUID LIMIT GREATER THAN 50	SILTS AND CLAYS		<b>CH</b>	INORGANIC CLAYS OF HIGH PLASTICITY		
		(LITTLE OR NO FINES)		<b>OH</b>	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS		
<b>HIGHLY ORGANIC SOILS</b>				<b>PT</b>	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS		

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.



Earth Solutions NW, LLC  
 2603 151st Pl. NE  
 Redmond, WA 97511  
 Telephone: 425-300-3300  
 Fax: 425-284-2855

# BORING NUMBER B-1

PAGE 2 OF 3

CLIENT William Weinstein

PROJECT NAME 75 Skagit Key

PROJECT NUMBER 0245

PROJECT LOCATION Bellevue, Washington

GENERAL BH / TP / WELL / 0245.GPJ GINT US.GDT 11/1/05

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
20							
	SS	100	1-2-1 (3)	MC = 417.10%	PT		Brown fibrous PEAT, soft, wet
25							
	SS	67	1-1	MC = 55.00%	CH		Gray fat CLAY, very soft, wet  -sand layers
30							
	SS	67	1-1	MC = 39.60%	SP-SM		Gray poorly graded SAND with silt, very loose, wet
					OL		Brown organic SILT, very soft, wet
35							
	SS	100	1-2-2 (4)	MC = 109.40% MC = 31.30%	SP-SM		Brown poorly graded fine SAND with silt, very loose, wet
					ML		Gray SILT with sand, very loose, wet
40							
	SS	100	1-1-1 (2)	MC = 42.60%	SP-SM		Gray poorly graded SAND with silt, very loose, wet
					CH		Gray fat CLAY, very soft, wet



Earth Solutions NW, LLC  
 2603 151st Pl. NW  
 Redmond, WA 97003  
 Telephone: 425-883-3300  
 Fax: 425-284-2855

**BORING NUMBER B-2**

CLIENT William Weinstein PROJECT NAME 75 Skagit Key  
 PROJECT NUMBER 0245 PROJECT LOCATION Bellevue, Washington  
 DATE STARTED 10/5/05 COMPLETED 10/5/05 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE \_\_\_\_\_  
 DRILLING CONTRACTOR Boretec GROUND WATER LEVELS:  
 DRILLING METHOD HSA ∇ AT TIME OF DRILLING 7.5 ft  
 LOGGED BY SSR CHECKED BY SSR AT END OF DRILLING ---  
 NOTES \_\_\_\_\_ AFTER DRILLING ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0							
							Dark brown silty SAND, loose, moist (Fill)
							-mottled texture
	SS	100	5-5-5 (10)	MC = 32.50%			
5					SM		
	SS	100	2-1-2 (3)	MC = 55.80%			-increase in silt
							∇ -decrease in silt, water bearing
	SS	100	1-2-2 (4)	MC = 85.80%			
10							
	SS	100	1-1-1 (2)	MC = 141.00%			Brown organic SILT, very soft, wet
15					OL		
	SS	100	1-1-1 (2)	MC = 232.30%			-peat layers
20							

GENERAL BH / TP / WELL / WELL 0245.GPJ GINT US.GDT 11/1/05



Earth Solutions NW, LLC  
 2603 151st Pl. NE  
 Redmond, W 97512  
 Telephone: 425.3300  
 Fax: 425.2842855

**BORING NUMBER B-2**

CLIENT William Weinstein

PROJECT NAME 75 Skagit Key

PROJECT NUMBER 0245

PROJECT LOCATION Bellevue, Washington

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
45						CH	Gray fat CLAY, very soft, wet (continued)
	SS	100	1-1-1 (2)	MC = 30.00%			-sand and silt layers
50							
	SS	100	2-3-4 (7)	MC = 146.50%			-silt layers
55							
	SS	100	2-3-7 (10)	MC = 67.20%			
60							
	SS	100	8-11-14 (25)	MC = 24.40%	SM		Gray silty SAND, medium dense, wet
							-contains gravel
							Boring terminated at 61.5 feet below existing grade. Groundwater table encountered at 7.5 feet during drilling. Top 20.0 feet slotted. Boring backfilled with bentonite and cuttings. Bottom of hole at 61.5 feet.

GENERAL BH / TP / WELL / O245.GPJ GINT US.GDT 11/1/05

# Attachment I

## **TURBIDITY MONITORING PLAN** Coal Creek Salmon Channel Enhancement Project Weinstein Properties, 73 & 75 Skagit Key

RECEIVED

**Prepared for:**

SEP 22 2006

City of Bellevue

PERMIT PROCESSING

Planning and Community Development  
450 110<sup>th</sup> Avenue NE  
Bellevue, Washington 98009

**Prepared by:**

The Watershed Company  
750 Sixth Street South  
Kirkland, WA 98033

p 425.822.5242  
f 425.827.8136

22 September 2006



THE  
WATERSHED  
COMPANY

**Turbidity Monitoring Plan  
Coal Creek Salmon Channel Enhancement Project  
Weinstein Properties, 73 & 75 Skagit Key****Project Description**

High sediment loads on Coal Creek have led to aggradation of the existing channel where it meets Lake Washington. While delta formation is a natural process that occurs at virtually every stream where it meets relatively still water, the volume of sediment on Coal Creek and the manipulation of lake levels contrary to natural lake-level fluctuations have produced a delta that has very poorly defined channels and may lack sufficient depth for optimal migration by fish. This project is designed to help maintain a channel adequate to facilitate upstream fish migration and provide habitat for both adult and juvenile fish that use Coal Creek. The project will install large woody debris in the stream channel at strategic locations and at specific orientations to encourage channelization and formation of pools.

Construction of the channel enhancement is expected to occur in one phase, starting in late July or early August. Stormwater best management practices (BMPs) to be employed include two layers of silt fencing around all work sites, and catch basin inserts in all applicable catch basins. If conditions warrant, sedimentation tanks (Baker tanks) will be used.

Additionally, a single-family dwelling and pond will be constructed on the property that forms the northern bank of Coal Creek in this vicinity. Both projects are proposed by the same property owner, but can be, and likely will be, constructed independently of each other. However, the turbidity monitoring plan for each project will be the same.

Construction of the house and pond are expected to occur in a single phase, separate from that of the channel enhancement project. The two phases may overlap in time.

**Drainage Analysis**

The site is located on the banks of Coal Creek at its mouth on Lake Washington. Runoff from the site drains towards the creek, and is then carried westward by the creek into Lake Washington.

**Monitoring Locations**

Use of a single upstream location and a single downstream location is proposed to monitor turbidity. The upstream location will be at the culvert under Skagit Key. The downstream location will be at the end of the peninsula that is formed on the southern bank of Coal Creek as it enters Lake Washington. Both locations are shown on the site plan (sheet CS2). These locations will be suitable to monitor both the stream phase and the dwelling phase of this project.

During each monitoring visit, the upstream turbidity measurements will be compared to the downstream turbidity measurements to determine if the site is in compliance with turbidity standards.

### **Baseline Data**

Baseline data will be gathered by sampling at the downstream sample location at least twice weekly for a period of two weeks prior to the initiation of construction activities if flow from precipitation is available. Baseline turbidity will be calculated by taking the mean of all gathered samples. If circumstances prevent the collection of samples (i.e., no stormwater is present or flowing), historic turbidity levels will be obtained from the City Utilities Department. If historic data is unavailable, the City Utilities Department will determine baseline turbidity levels based on their best judgment. In the event that an upstream sample is unavailable, the downstream sample will be compared to the baseline to determine if turbidity levels are acceptable or in exceedence.

### **Field Testing**

The Watershed Company shall perform all monitoring for the site, including background data gathering and analysis. Mark Indrebo will be the project manager and can be contacted at (425) 822-5242. Watershed Company staff shall record all turbidity data on a standardized monitoring data sheet to insure consistency (Figure 1). All samples will be tested in the field using an HF Scientific DRT-15CE portable Turbidimeter, or equivalent. This instrument is capable of measuring turbidity between 0 and 1,000 NTU with the following accuracy, which meets or exceeds EPA specifications:

- $\pm 1\%$  (0-10 NTU)
- $\pm 2\%$  (0-100 NTU)
- $\pm 5\%$  (0-1,000 NTU)

This instrument will be calibrated according to the manufacturer's specifications, and reference standards will be tested daily.

### **Monitoring Frequency**

Construction of the Salmon Channel Enhancement project is expected to occur in the dry season, defined as May 1 through October 31. During this time, sampling will occur during each precipitation event in which rainfall occurs continuously for two or more hours during the hours of construction or when daily precipitation is expected to exceed 0.5 inch, with a minimum sampling frequency of once per week. However, if no significant precipitation is recorded during a week, sampling may be forborne with approval from the Clearing and Grading inspector provided that a report is filed indicating the reason for not sampling. If testing indicates that turbidity exceeds standards, the City Clearing and Grading Inspector may require additional sampling. Construction of the dwelling phase of the project may occur into the wet season, defined as November 1 through April 30, during which sampling will occur during each rain event with a minimum frequency of once per week. Monitoring will be discontinued when the City of Bellevue Clearing and Grading Inspector notifies The Watershed Company that monitoring is no longer needed.

### **Reporting Requirements**

Monitoring data sheets (see Figure 1) will be faxed or otherwise delivered to the City of Bellevue Clearing and Grading Inspector as soon as practical after monitoring; in no instance will this be

more than 24 hours after monitoring. A copy of each report will also be faxed to the owner and/or contractor.

### **Compliance with Water Quality Standards**

Compliance with the City of Bellevue and Washington State Surface Water Quality Standards (WAC 173.201A-030) shall be determined by subtracting the background turbidity measurement (measured at the upstream sampling locations during the site visit) from the downstream turbidity measurement. The allowable turbidity increase is 5.0 NTU over background levels when background levels are less than 50 NTU, and 10% over background levels when they are greater than 50 NTU. Each report will clearly identify whether the site complies with these standards. If for any reason the background turbidity measurement cannot be determined, the baseline turbidity, determined by testing prior to the commencement of constructions (see above), will be used in place of the background turbidity.

In the event that monitoring indicates an exceedence of water quality standards, The Watershed Company will immediately notify the contractor, as well as the City of Bellevue Clearing and Grading Inspector. The contractor shall be responsible for determining and immediately implementing the most appropriate measures to correct the situation, and may solicit the input of the Clearing and Grading Inspector, the monitor, and/or any other outside resource. The Clearing and Grading Inspector has the authority to require additional erosion control measures and may issue a Stop Work Order to mitigate water quality concerns.

### **Final Report**

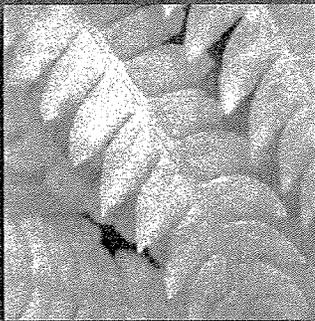
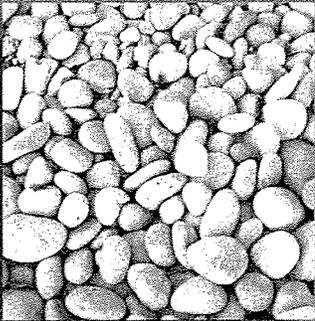
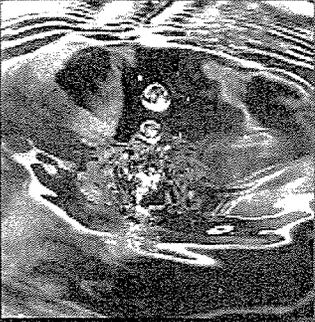
Upon the termination of monitoring services, The Watershed Company will prepare and submit a final report to the Clearing and Grading Inspector and the property owner. This report will indicate the reason for termination of services and include a summary of turbidity data, final turbidity levels, and a discussion of outstanding issues that may not have been fully addressed.

**Figure 1: Standardized Monitoring Data Sheet**

Date & Time of Sample: _____				Baseline Turbidity (NTU): _____			
Weather Conditions:							
Upstream		Downstream		Turbidity Increase (NTU)	Allowable Increase (NTU)	Standard Exceeded? (Y/N)*	Contractor Notified? (Y/N)
Location	Turbidity (NTU)	Location	Turbidity (NTU)				
Upstream		Downstream					
Corrective Measures taken by Contractor (if turbidity levels exceed State standards):							
Other Comments:							

\* Clearing & Grading Inspector must be notified by telephone if standard is exceeded.

Signature: \_\_\_\_\_



# Attachment J

## HYDRAULIC ASSESSMENT Woody Debris Installation in Coal Creek Weinstein Properties, 73/75 Skagit Key

RECEIVED

SEP 22 2006

PERMIT PROCESSING

### Prepared for:

City of Bellevue  
Planning and Community Development  
450 110<sup>th</sup> Avenue NE  
Bellevue, Washington 98009

### Prepared by:

The Watershed Company  
750 Sixth Street South  
Kirkland, WA 98033  
p 425.822.5242  
f 425.827.8136

5 September 2006



THE  
WATERSHED  
COMPANY

September 5, 2006

Ms. Leah Hyatt, Assistant Planner  
City of Bellevue Utilities Department  
450 110th Ave. NE  
P.O. Box 90012  
Bellevue, WA 98009

Dear Ms. Hyatt,

### **Background**

This letter documents the results of a hydraulic assessment I conducted on the lower portion of Coal Creek, downstream from the road culvert at Skagit Key (Figure 1). In an email from you dated July 21, 2006, the City of Bellevue expressed concern that large woody debris installations planned for the lower portion of the creek may have adverse affects on hydraulic performance in the reach upstream.

### **Description of the Project Area**

I conducted a reconnaissance of the project area on August 30, 2006. The upstream extent of the creek in the project area is located at the downstream end of the culvert at Skagit Key (Photo 1 in Attachment A). Existing features along the creek in the project area include a gravel bar (Sta 6+10 to Sta 5+40) and a rockery (Sta 5+50 to Sta 4+50) adjacent to a single-family residence (Photos 2 and 3 in Attachment A). Trees, shrubs, and briars provide cover along both banks of the creek from the Skagit Key culvert to approximately Sta 3+00. The vegetation along the left bank is generally less dense than on the right bank and turns into residential lawn at Station 4+00. The creek develops a flatter gradient as is outlets to Lake Washington (Photo 4 in Attachment A).

### **Method of Assessment**

I conducted a hydraulic assessment to demonstrate the affect of the proposed woody debris installations on the water surface elevations in the creek. In conducting the assessment, I followed guidelines requested by the City in their correspondence dated July 21, 2006.

The following is a summary of the analysis procedures that I used in preparing the hydraulic assessment:

1. I obtained the City's HEC-RAS model of lower Coal Creek and added sections that begin at the downstream end of the proposed woody debris installations. The City's model began 495 feet upstream from the start of the project. The sections I added

included 0+00 through 4+50, spaced 50 feet apart. The geometry of these cross sections was based on topographic data obtained earlier this year for the woody debris installation project. The project reach is represented by Sections 0+00 through 7+16 in the HEC-RAS model (Figure 2).

2. I obtained construction plans for the woody debris installation project (dated 7-26-06) and measured the station locations of each woody debris cluster along each cross section (Figure 3).
3. The base case simulation represented the creek without the woody debris structures. For the base case, channel roughness coefficients for the channel and overbanks were characterized in the same manner and using the same values as they were in the City's original HEC-RAS model.
4. A range in Manning's n coefficients were used to characterize the effect of the woody debris on the channel's roughness coefficient. Manning's n was entered in horizontal stations across each section. In general, the woody debris structures were modeled as if they were installed against the streambank, with the exception of v-logs, which affected the roughness across the channel. The roughness coefficient at stations where large woody debris are proposed were assessed for a range of values including values of 0.060, 0.080, 0.100, and 0.120. A separate simulation was conducted for each roughness coefficient.
5. A tailwater condition at Station 0+00 assumed a fixed water surface elevation of 18.6 feet NAVD 88. This downstream boundary condition represents the summer high Lake Washington elevation maintained by the Army Corp of Engineers.
6. Flow rates representative of bankfull flow discharge were used in the calculations. Flow rates for the I-405 regional detention pond immediately upstream of the project reach were obtained from HSPF simulation results prepared under a City basin study. Flow rates for the 1.01-year (137 cubic feet per second) and 2-year (268 cubic feet per second) return periods were modeled.
7. The HEC-RAS model was used to predict the water surface elevation in Coal Creek, including at the downstream end of Skagit Key culvert. This culvert is located at the upper limits of the project site.

## **Modeling Results**

The type and location of the woody debris installations at each HEC-RAS cross section are listed in Table 1. HEC-RAS results are provided in Attachment B. Graphic results presented in Attachment B, including a profile of the study reach and cross sections, compare the base case simulation (no woody debris in place) with the Manning's n value of 0.080 to represent the woody debris. Tabular results for all modeling scenarios are also presented in Attachment B.

It is my understanding that the design specifications for the installations would require tight installations of the debris against the channel banks. Root wads and limbs would be trimmed to reduce hydraulic turbulence yet still provide improved passage for fish. For this reason, only the roughness coefficients of the streambanks would be affected in these instances. At cross sections where v-logs would be installed, the channel roughness would also be affected.

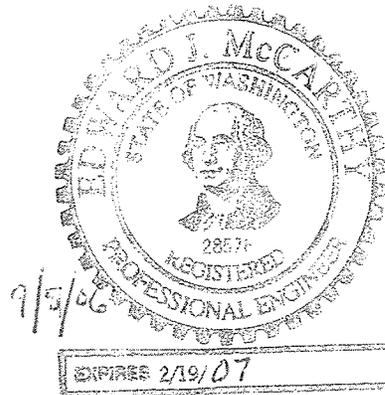
Based on the predicted HEC-RAS water surface elevations, the woody debris would not significantly change the hydraulic grade line at the downstream end of Skagit Key culvert (Station 7+16). This result is true for both the 1.1-year and 2-year flow rates. For the 2-year flow rate for instance, the predicted water surface elevation at Station 7+16 was 21.83 feet under existing channel conditions compared to a predicted elevation of 21.87 feet with the woody debris installed (assuming a Manning's n value of 0.120).

The hydraulic modeling assessment conducted did not account for the anticipated improved stability in channel conveyance capacity that would likely occur over time with placement of the woody debris. The woody debris placement is designed to create localized scour and facilitate the transport of sediment through the channel. Over time, this action would help maintain the capacity of the channel rather than allow sediment to accumulate, as is currently the trend. Without the woody debris, the channel could be expected to have a trend towards aggradation, ultimately resulting in reduced channel conveyance capacity. With such a reduction in channel capacity, the creek's hydraulic grade line has the potential to increase compared to existing conditions.

Sincerely,

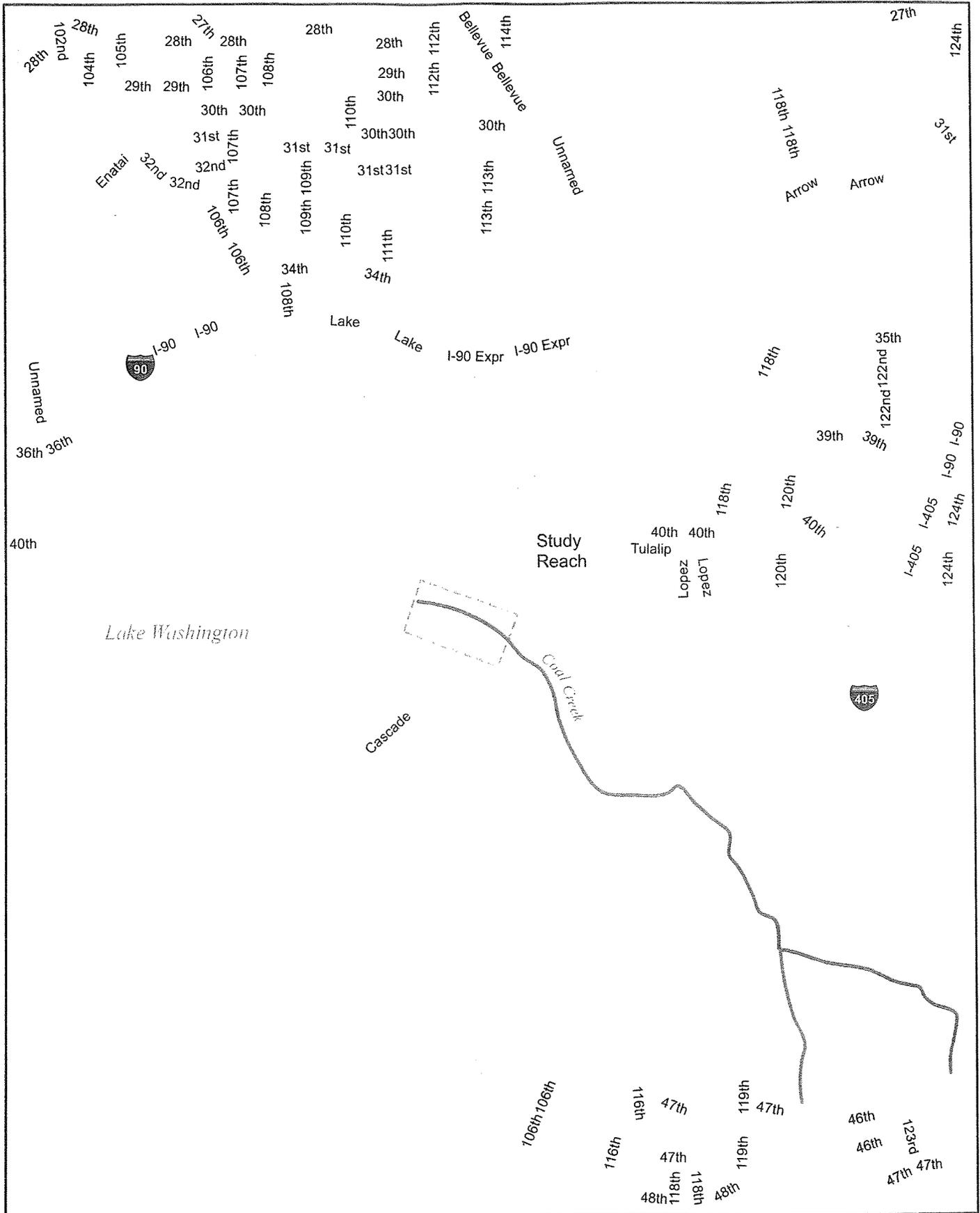


Edward McCarthy, Ph.D. P.E.  
Hydrologist



**Table 1. Locations of Woody Debris Installations along HEC-RAS Cross Sections.**

<b>Cross Section</b>	<b>Left Bank</b>	<b>Channel</b>	<b>Right Bank</b>
0+00	fallen trees	v-logs	
0+50	fallen trees	v-logs	
1+00	fallen trees	v-logs	
1+50	fallen trees		bank logs
2+00	revetment logs		revetment logs
2+50	bank logs		revetment logs
3+00	root wads		
3+50	revetment logs		
4+00	revetment logs		
4+50	revetment logs		
4+95	bank logs		
5+19	bank logs		
6+10	fallen trees		
7+16	fallen trees		fallen trees



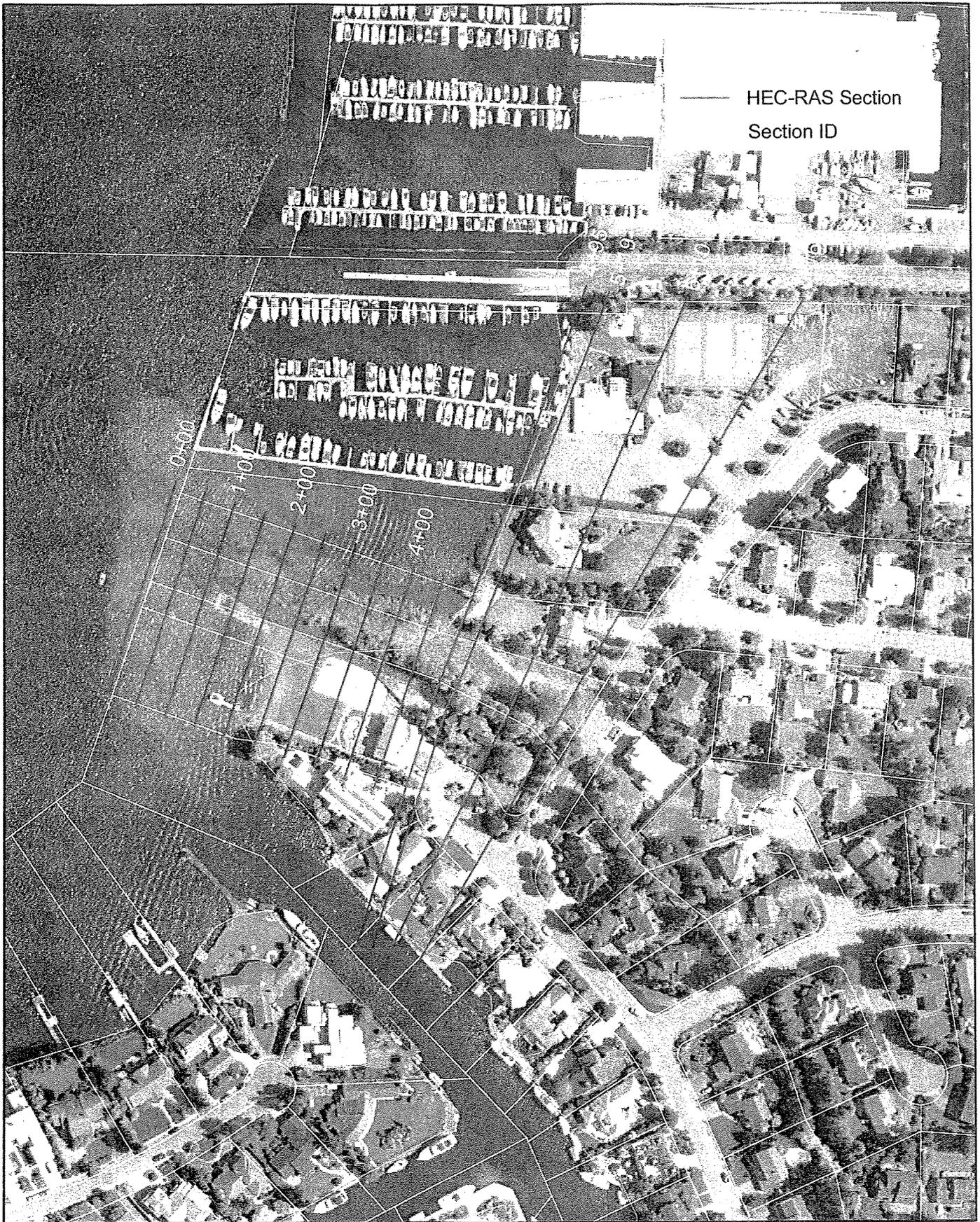
**Vicinity Map**  
 Coal Creek - Skagit Key  
 Bellevue, Washington



1,000  
 Feet

**THE WATERSHED COMPANY**  
 750 South Street South Kirkland WA 98033  
 425.822.5242 / 425.827.8136  
 watershedco.com

Proj. No.  
 Date 8/25/06  
**Figure 1**



**Cross Section Locations**

Coal Creek - Skagit Key  
 Bellevue, Washington



200

Feet



750 Sixth Street South Kirkland WA 98033  
 t. 425.822.5242 f. 425.827.8136  
 watershedco.com

Proj. No.

Date

8/25/06

**Figure 2**



**Attachment A: Photographs of Lower Coal Creek**

▼ Photo Number 1

Date of Photo:	8-30-06
Location:	Sta 7+56
Description:	Downstream end of culvert at Skagit Key.



▼ Photo Number 2

Date of Photo:	8-30-06
Location:	Sta 6+00
Description:	Gravel bar along left bank of channel.



**Attachment A: Photographs of Lower Coal Creek**

▼ Photo Number 3	
Date of Photo:	8-30-06
Location:	Sta 5+19
Description:	Rockery on left bank.



▼ Photo Number 4	
Date of Photo:	8-30-06
Location:	Sta 3+00
Description:	Lower end of study reach where creek outlets to Lake Washington.



## **Attachment B: HEC-RAS Results**

### HEC-RAS Plan IDs:

ManCOB = City of Bellevue Manning's n to represent existing channel with no woody debris

Man060 = Manning's n of 0.060 used to represent woody debris installations

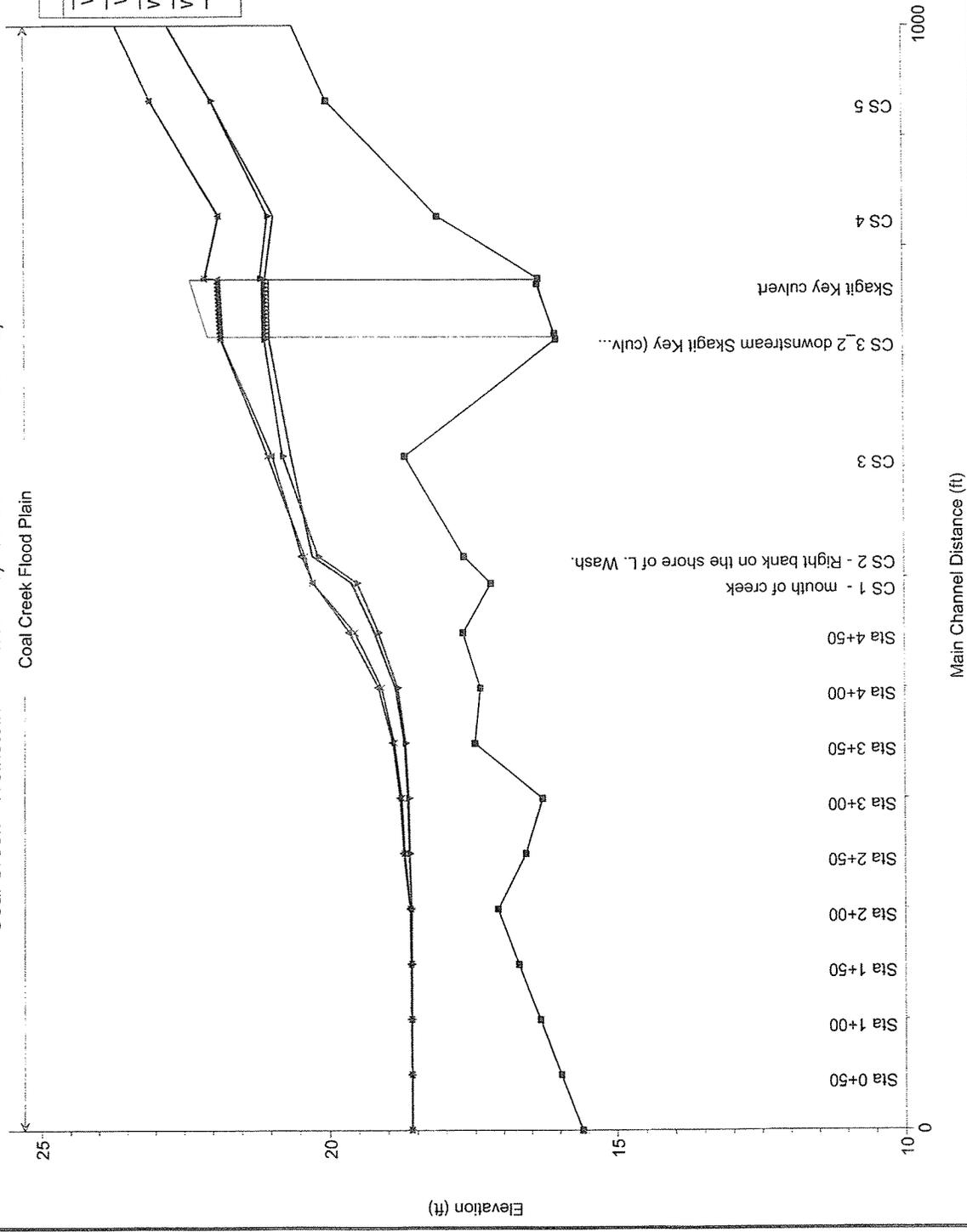
Man080 = Manning's n of 0.080 used to represent woody debris installations

Man100 = Manning's n of 0.100 used to represent woody debris installations

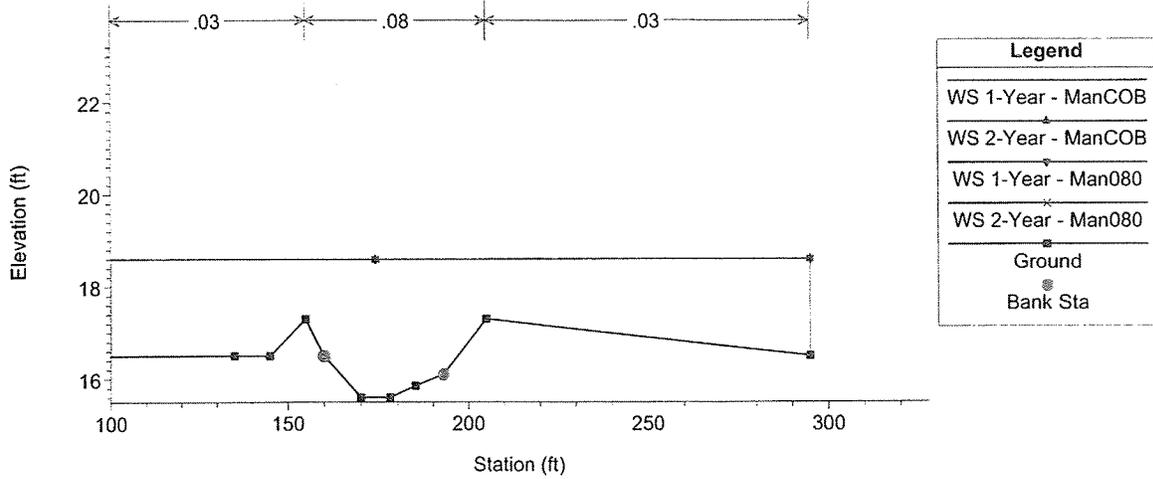
Man120 = Manning's n of 0.120 used to represent woody debris installations

Coal Creek - Weinstein Plan: 1) Man080 9/4/2006 2) ManCOB 9/4/2006 Coal Creek Flood Plain

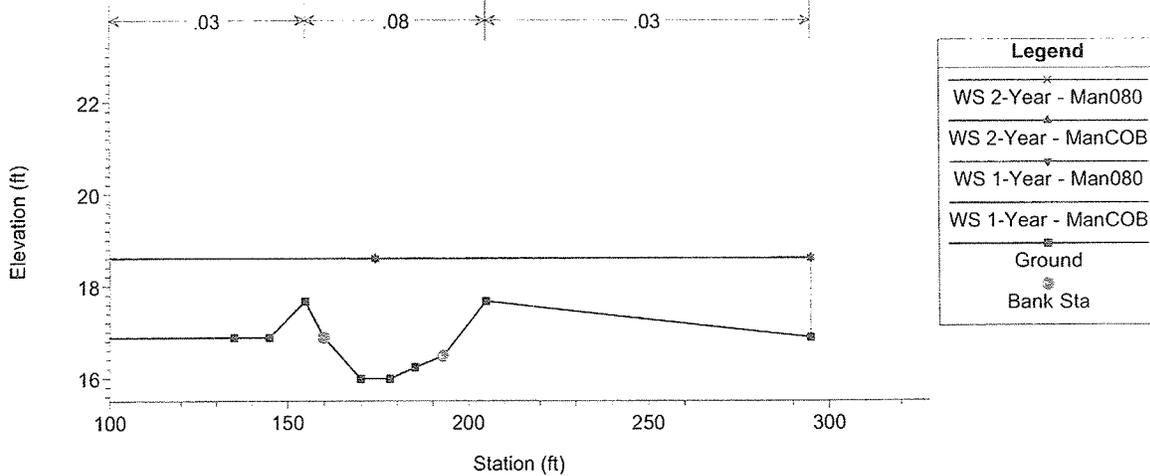
Legend	
WS 1-Year - Man080	▲
WS 2-Year - Man080	▼
WS 1-Year - ManCOB	◆
WS 2-Year - ManCOB	■
Ground	□



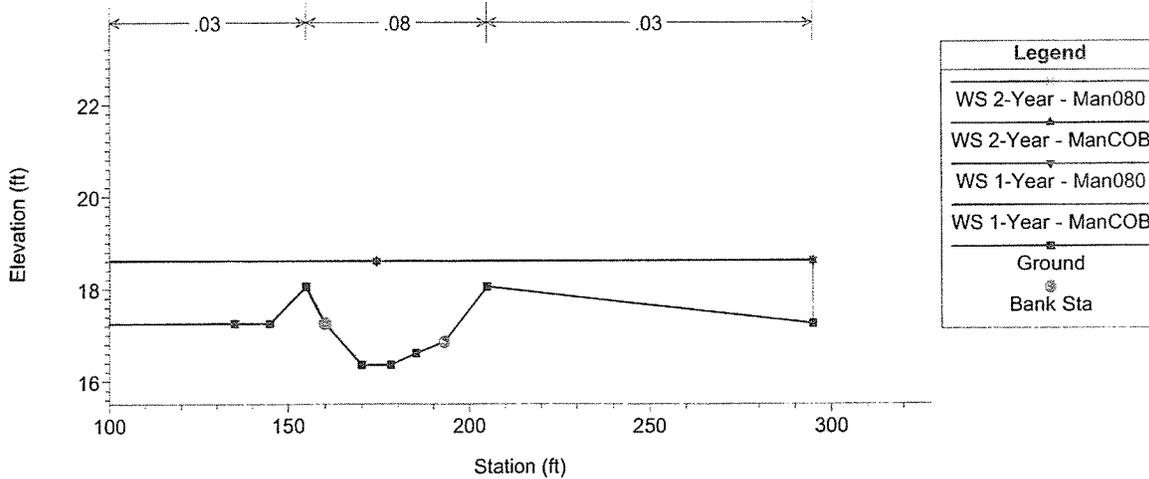
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006  
 River = Coal Creek Reach = Flood Plain RS = 0 Sta 0+00



Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006  
 River = Coal Creek Reach = Flood Plain RS = 50 Sta 0+50



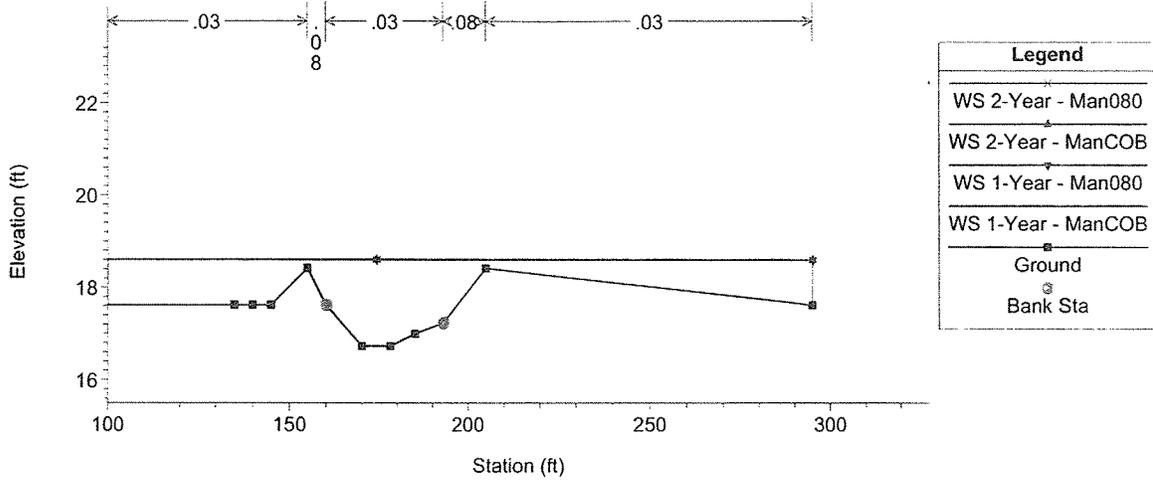
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006  
 River = Coal Creek Reach = Flood Plain RS = 100 Sta 1+00



1 in Horiz. = 50 ft 1 in Vert. = 4 ft

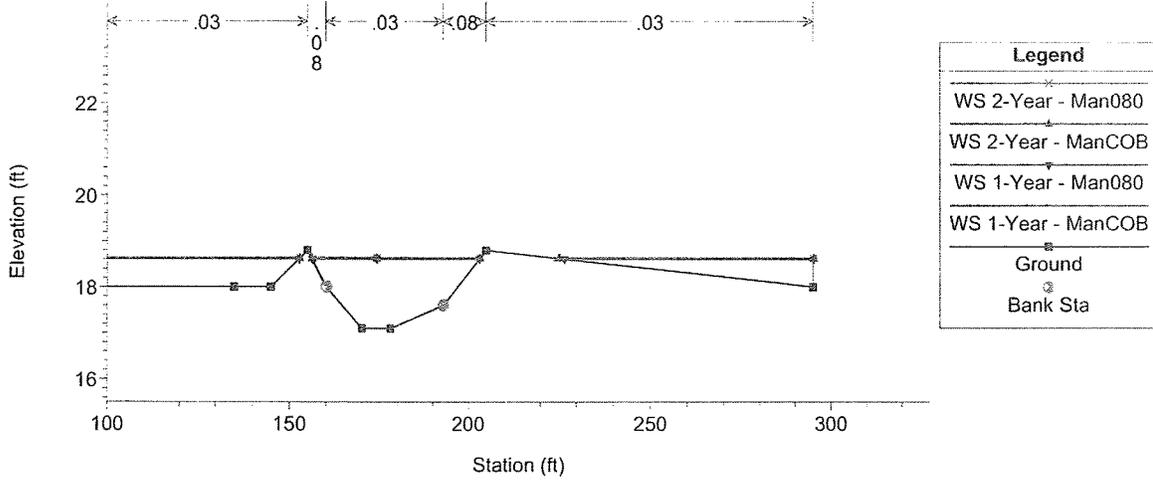
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006

River = Coal Creek Reach = Flood Plain RS = 150 Sta 1+50



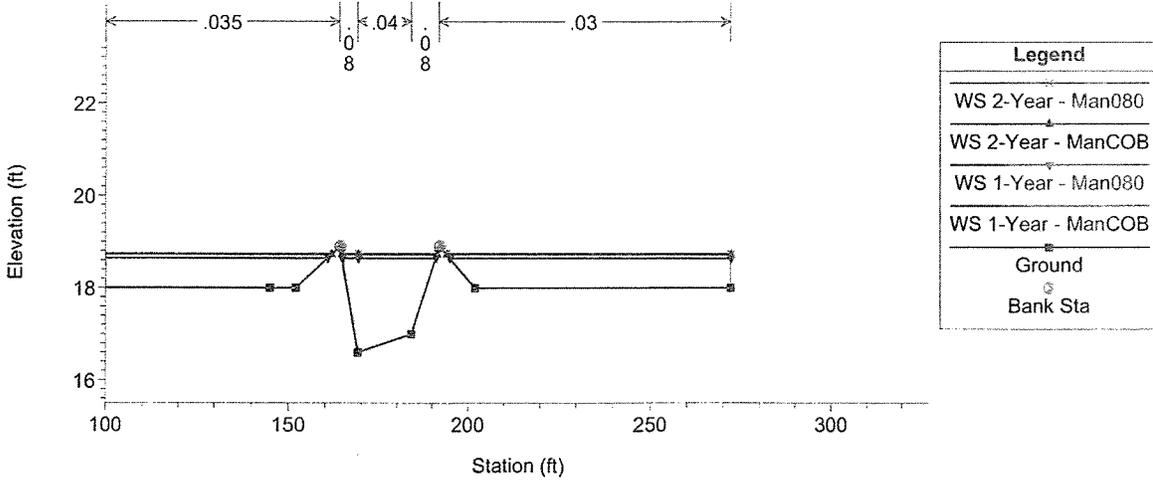
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006

River = Coal Creek Reach = Flood Plain RS = 200 Sta 2+00



Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006

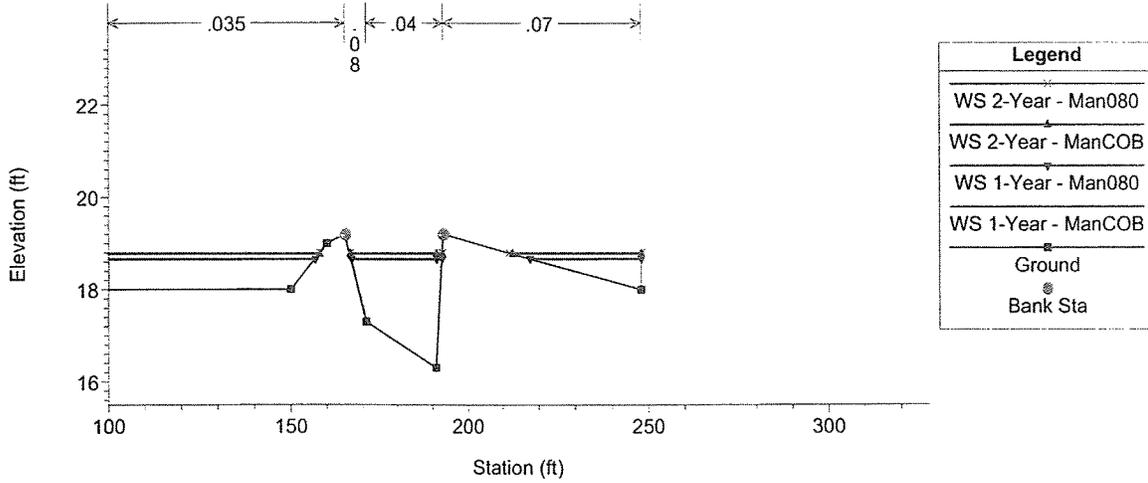
River = Coal Creek Reach = Flood Plain RS = 250 Sta 2+50



1 in Horiz. = 50 ft 1 in Vert. = 4 ft

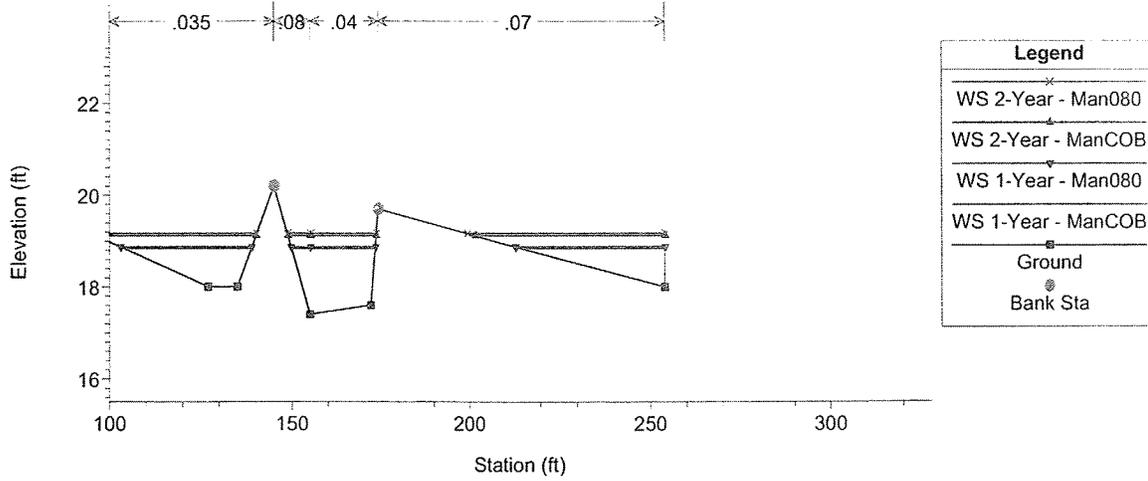
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006

River = Coal Creek Reach = Flood Plain RS = 300 Sta 3+00



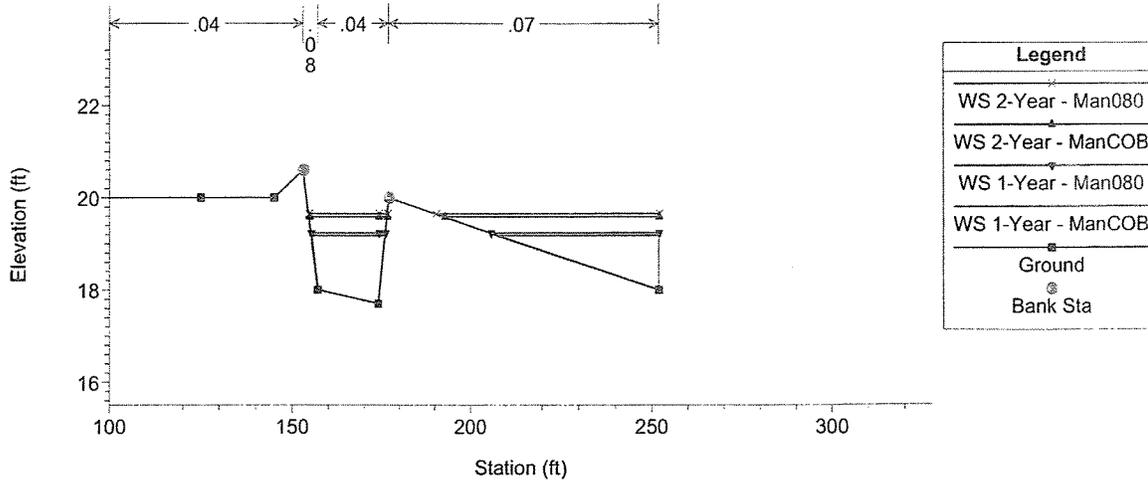
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006

River = Coal Creek Reach = Flood Plain RS = 400 Sta 4+00



Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006

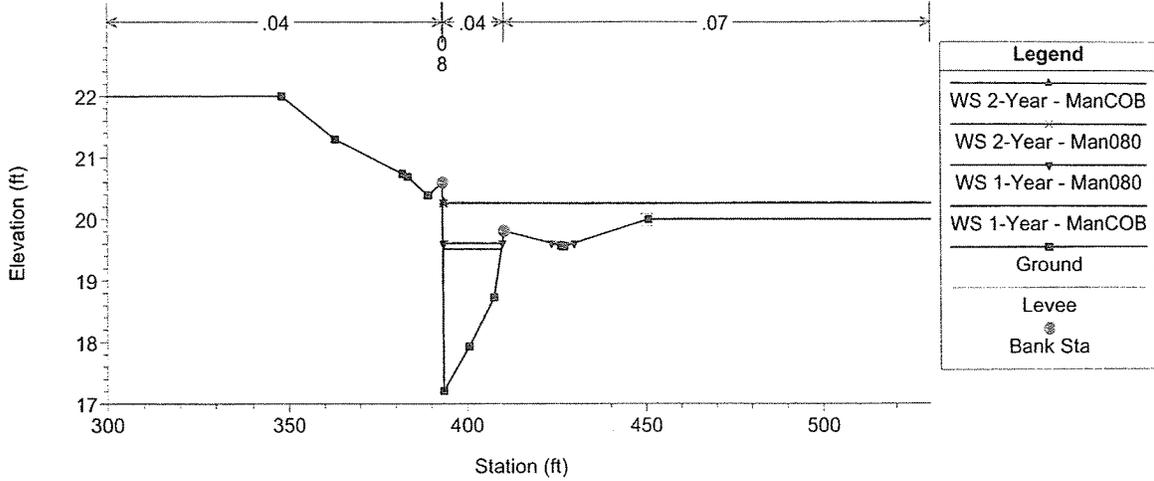
River = Coal Creek Reach = Flood Plain RS = 450 Sta 4+50



1 in Horiz. = 50 ft 1 in Vert. = 4 ft

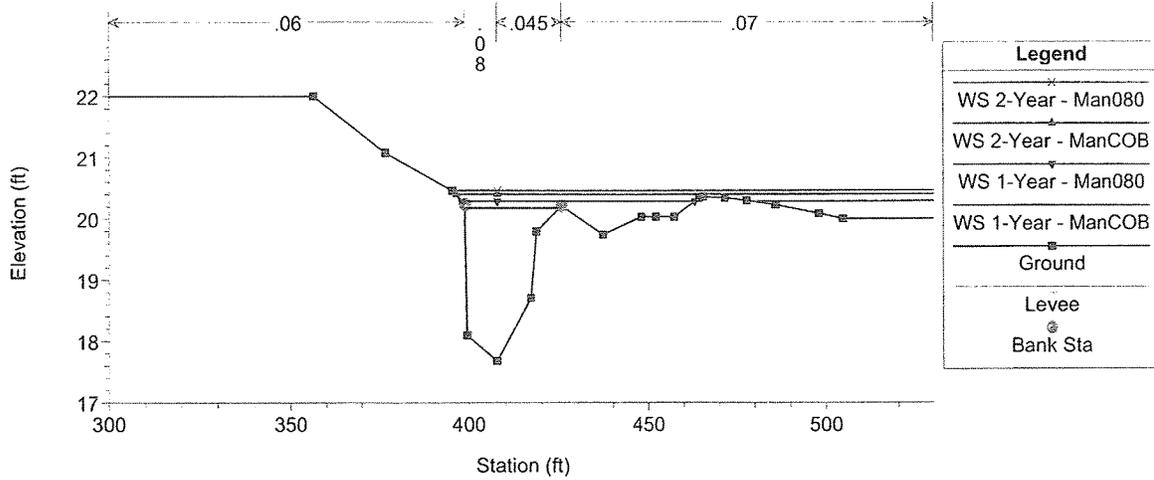
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006

River = Coal Creek Reach = Flood Plain RS = 495. CS 1 - mouth of creek



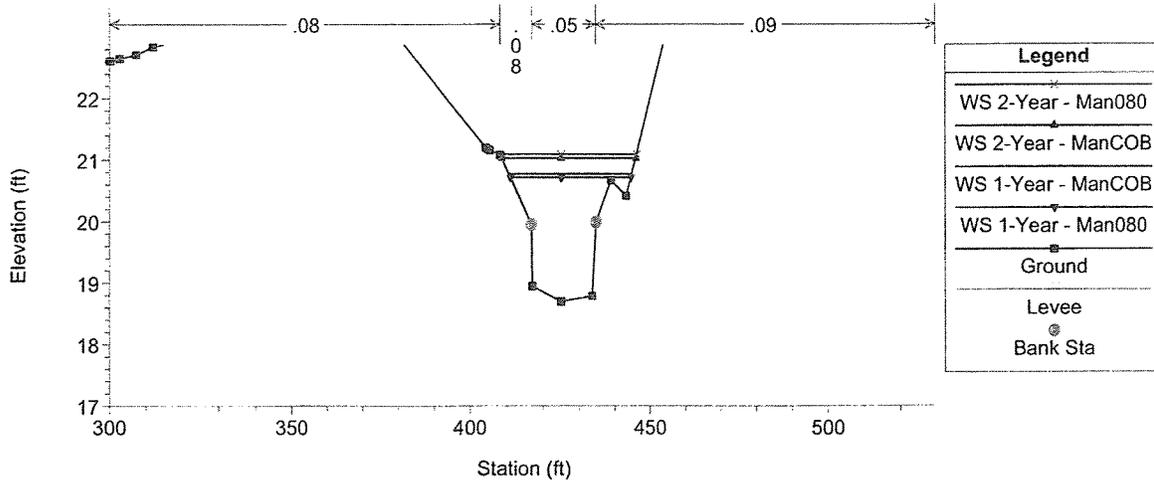
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006

River = Coal Creek Reach = Flood Plain RS = 519. CS 2 - Right bank on the shore of L. Wash.



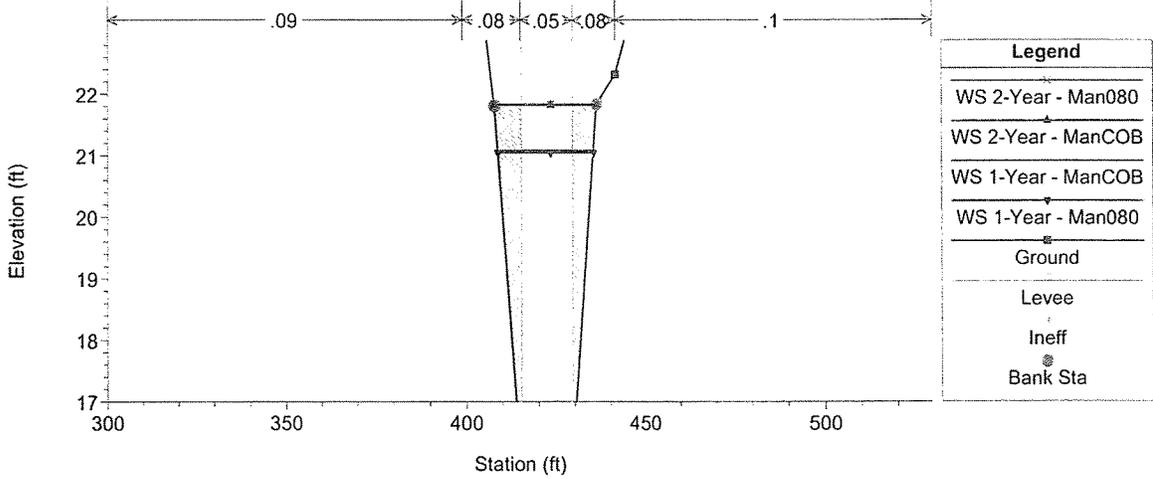
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006

River = Coal Creek Reach = Flood Plain RS = 610. CS 3

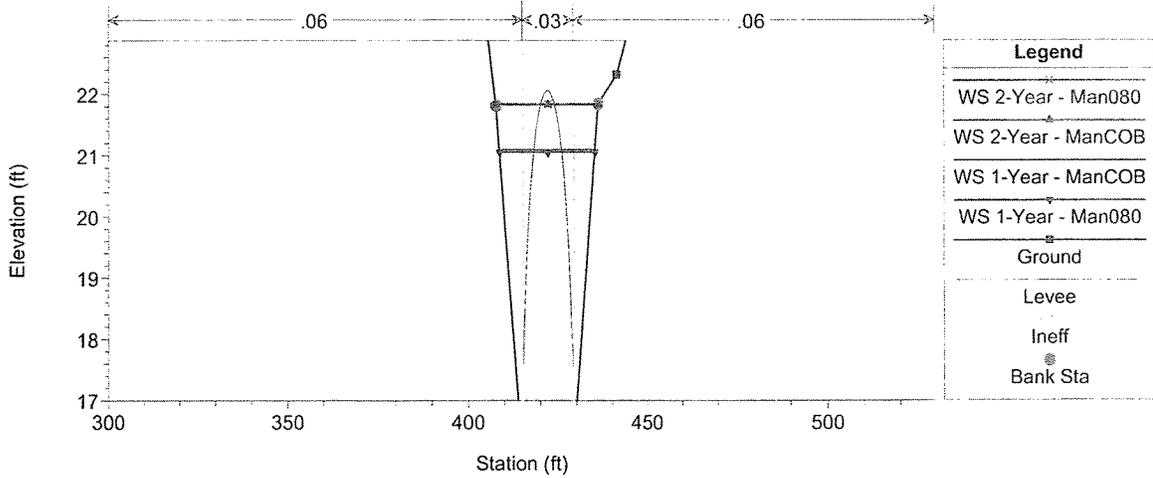


1 in Horiz. = 50 ft 1 in Vert. = 3 ft

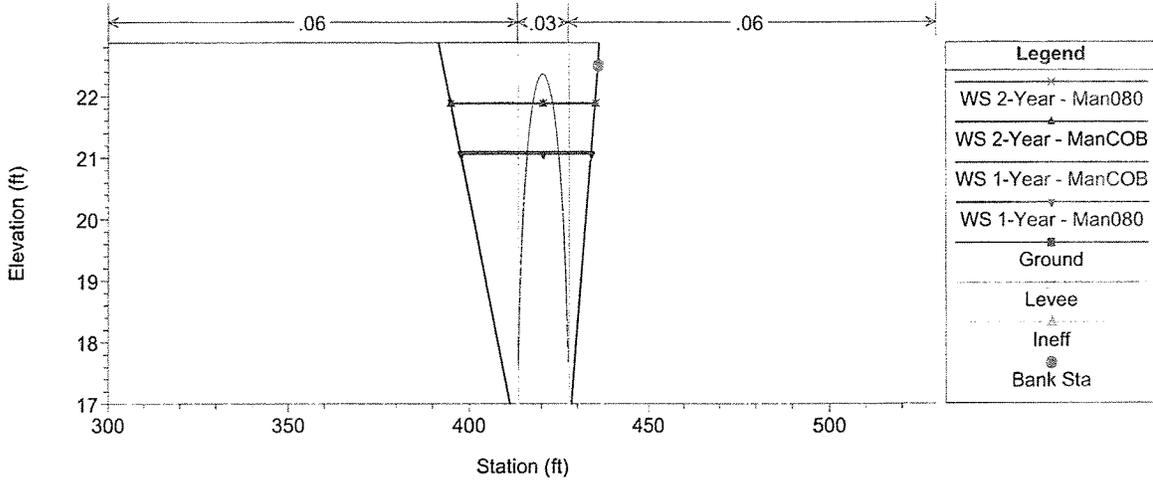
Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006  
 River = Coal Creek Reach = Flood Plain RS = 716 CS 3\_2 downstream Skagit Key (culvert #1)



Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006  
 River = Coal Creek Reach = Flood Plain RS = 721 Culv Skagit Key culvert



Coal Creek - Weinstein Plan: 1) ManCOB 9/5/2006 2) Man080 9/5/2006  
 River = Coal Creek Reach = Flood Plain RS = 721 Culv Skagit Key culvert



1 in Horiz. = 50 ft 1 in Vert. = 3 ft

HEC-RAS River: Coal Creek Reach: Flood Plain

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E. G. Elev (ft)	E. G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Ctl
Flood Plain	0	1-Year	ManCOB	137.00	15.60	18.60	16.69	18.60	0.000008	0.28	596.43	295.00	0.03
Flood Plain	0	1-Year	Man060	137.00	15.60	18.60	16.65	18.60	0.000011	0.16	596.43	295.00	0.02
Flood Plain	0	1-Year	Man080	137.00	15.60	18.60	16.63	18.60	0.000011	0.12	596.43	295.00	0.01
Flood Plain	0	1-Year	Man100	137.00	15.60	18.60	16.62	18.60	0.000012	0.10	596.43	295.00	0.01
Flood Plain	0	1-Year	Man120	137.00	15.60	18.60	16.63	18.60	0.000012	0.09	596.43	295.00	0.01
Flood Plain	0	2-Year	ManCOB	268.00	15.60	18.60	16.86	18.60	0.000032	0.55	596.43	295.00	0.06
Flood Plain	0	2-Year	Man060	268.00	15.60	18.60	16.79	18.60	0.000041	0.31	596.43	295.00	0.03
Flood Plain	0	2-Year	Man080	268.00	15.60	18.60	16.77	18.60	0.000044	0.24	596.43	295.00	0.03
Flood Plain	0	2-Year	Man100	268.00	15.60	18.60	16.79	18.60	0.000046	0.20	596.43	295.00	0.02
Flood Plain	0	2-Year	Man120	268.00	15.60	18.60	16.81	18.60	0.000047	0.17	596.43	295.00	0.02
Flood Plain	50	1-Year	ManCOB	137.00	15.98	18.60		18.60	0.000016	0.36	484.98	295.00	0.04
Flood Plain	50	1-Year	Man060	137.00	15.98	18.60		18.60	0.000021	0.20	485.03	295.00	0.02
Flood Plain	50	1-Year	Man080	137.00	15.98	18.60		18.60	0.000023	0.16	485.04	295.00	0.02
Flood Plain	50	1-Year	Man100	137.00	15.98	18.60		18.60	0.000024	0.13	485.05	295.00	0.01
Flood Plain	50	1-Year	Man120	137.00	15.98	18.60		18.60	0.000025	0.11	485.05	295.00	0.01
Flood Plain	50	2-Year	ManCOB	268.00	15.98	18.60		18.61	0.000063	0.70	485.19	295.00	0.08
Flood Plain	50	2-Year	Man060	268.00	15.98	18.60		18.61	0.000082	0.40	485.38	295.00	0.05
Flood Plain	50	2-Year	Man080	268.00	15.98	18.60		18.61	0.000088	0.31	485.42	295.00	0.04
Flood Plain	50	2-Year	Man100	268.00	15.98	18.60		18.61	0.000092	0.25	485.44	295.00	0.03
Flood Plain	50	2-Year	Man120	268.00	15.98	18.60		18.61	0.000095	0.21	485.45	295.00	0.02
Flood Plain	100	1-Year	ManCOB	137.00	16.35	18.60		18.60	0.000038	0.48	375.41	295.00	0.06
Flood Plain	100	1-Year	Man060	137.00	16.35	18.60		18.60	0.000050	0.28	375.58	295.00	0.03
Flood Plain	100	1-Year	Man080	137.00	16.35	18.60		18.60	0.000054	0.22	375.61	295.00	0.03
Flood Plain	100	1-Year	Man100	137.00	16.35	18.60		18.60	0.000057	0.18	375.63	295.00	0.02
Flood Plain	100	1-Year	Man120	137.00	16.35	18.60		18.60	0.000059	0.15	375.64	295.00	0.02
Flood Plain	100	2-Year	ManCOB	268.00	16.35	18.60		18.61	0.000143	0.94	376.06	295.00	0.12
Flood Plain	100	2-Year	Man060	268.00	16.35	18.61		18.61	0.000190	0.54	376.71	295.00	0.07
Flood Plain	100	2-Year	Man080	268.00	16.35	18.61		18.61	0.000206	0.42	376.83	295.00	0.05
Flood Plain	100	2-Year	Man100	268.00	16.35	18.61		18.62	0.000216	0.35	376.90	295.00	0.04
Flood Plain	100	2-Year	Man120	268.00	16.35	18.61		18.62	0.000224	0.29	376.94	295.00	0.04
Flood Plain	150	1-Year	ManCOB	137.00	16.73	18.60		18.61	0.000111	0.72	266.13	295.00	0.10
Flood Plain	150	1-Year	Man060	137.00	16.73	18.60		18.61	0.000115	0.73	266.46	295.00	0.10
Flood Plain	150	1-Year	Man080	137.00	16.73	18.60		18.61	0.000116	0.73	266.57	295.00	0.10
Flood Plain	150	1-Year	Man100	137.00	16.73	18.60		18.61	0.000116	0.74	266.65	295.00	0.10
Flood Plain	150	1-Year	Man120	137.00	16.73	18.60		18.61	0.000117	0.74	266.70	295.00	0.10
Flood Plain	150	2-Year	ManCOB	268.00	16.73	18.61		18.63	0.000418	1.40	267.84	295.00	0.19
Flood Plain	150	2-Year	Man060	268.00	16.73	18.61		18.63	0.000426	1.41	269.08	295.00	0.20
Flood Plain	150	2-Year	Man080	268.00	16.73	18.61		18.63	0.000428	1.42	269.50	295.00	0.20
Flood Plain	150	2-Year	Man100	268.00	16.73	18.61		18.63	0.000429	1.42	269.78	295.00	0.20
Flood Plain	150	2-Year	Man120	268.00	16.73	18.62		18.63	0.000430	1.42	269.98	295.00	0.20

HEC-RAS River: Coal Creek Reach: Flood Plain (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
Flood Plain	200	1-Year	ManCOB	137.00	17.10	18.61		18.62	0.000496	1.28	158.24	267.47	0.20	0.20
Flood Plain	200	1-Year	Man060	137.00	17.10	18.61		18.62	0.000508	1.30	158.56	267.64	0.20	0.20
Flood Plain	200	1-Year	Man080	137.00	17.10	18.61		18.62	0.000511	1.30	158.67	267.70	0.20	0.20
Flood Plain	200	1-Year	Man100	137.00	17.10	18.61		18.62	0.000513	1.30	158.74	267.74	0.21	0.21
Flood Plain	200	1-Year	Man120	137.00	17.10	18.61		18.62	0.000514	1.31	158.79	267.76	0.21	0.21
Flood Plain	200	2-Year	ManCOB	268.00	17.10	18.62		18.67	0.001766	2.44	162.37	269.65	0.38	0.38
Flood Plain	200	2-Year	Man060	268.00	17.10	18.62		18.68	0.001784	2.46	163.57	270.27	0.38	0.38
Flood Plain	200	2-Year	Man080	268.00	17.10	18.63		18.68	0.001785	2.46	163.98	270.49	0.38	0.38
Flood Plain	200	2-Year	Man100	268.00	17.10	18.63		18.68	0.001786	2.46	164.25	270.63	0.38	0.38
Flood Plain	200	2-Year	Man120	268.00	17.10	18.63		18.68	0.001785	2.46	164.44	270.73	0.38	0.38
Flood Plain	250	1-Year	ManCOB	137.00	16.60	18.63		18.64	0.000373	0.90	195.87	263.81	0.13	0.13
Flood Plain	250	1-Year	Man060	137.00	16.60	18.64		18.65	0.000405	0.76	196.77	263.91	0.11	0.11
Flood Plain	250	1-Year	Man080	137.00	16.60	18.64		18.65	0.000432	0.65	197.16	263.96	0.10	0.10
Flood Plain	250	1-Year	Man100	137.00	16.60	18.64		18.65	0.000455	0.57	197.39	263.99	0.08	0.08
Flood Plain	250	1-Year	Man120	137.00	16.60	18.64		18.65	0.000473	0.50	197.53	264.00	0.07	0.07
Flood Plain	250	2-Year	ManCOB	268.00	16.60	18.72		18.74	0.001019	1.52	218.43	266.43	0.22	0.22
Flood Plain	250	2-Year	Man060	268.00	16.60	18.73		18.75	0.001075	1.26	220.89	266.72	0.18	0.18
Flood Plain	250	2-Year	Man080	268.00	16.60	18.73		18.76	0.001132	1.07	221.90	266.83	0.15	0.15
Flood Plain	250	2-Year	Man100	268.00	16.60	18.73		18.76	0.001179	0.93	222.49	266.90	0.13	0.13
Flood Plain	250	2-Year	Man120	268.00	16.60	18.74		18.76	0.001218	0.82	222.86	266.94	0.12	0.12
Flood Plain	300	1-Year	ManCOB	137.00	16.30	18.65		18.67	0.000807	1.40	137.99	195.49	0.19	0.19
Flood Plain	300	1-Year	Man060	137.00	16.30	18.66		18.68	0.000848	1.32	139.15	195.92	0.18	0.18
Flood Plain	300	1-Year	Man080	137.00	16.30	18.66		18.68	0.000896	1.24	139.92	196.20	0.17	0.17
Flood Plain	300	1-Year	Man100	137.00	16.30	18.67		18.68	0.000945	1.17	140.53	196.43	0.16	0.16
Flood Plain	300	1-Year	Man120	137.00	16.30	18.67		18.68	0.000994	1.10	141.01	196.61	0.15	0.15
Flood Plain	300	2-Year	ManCOB	268.00	16.30	18.77		18.82	0.002028	2.30	161.20	203.88	0.31	0.31
Flood Plain	300	2-Year	Man060	268.00	16.30	18.78		18.83	0.002068	2.13	164.09	204.90	0.29	0.29
Flood Plain	300	2-Year	Man080	268.00	16.30	18.79		18.84	0.002141	1.97	165.94	205.55	0.26	0.26
Flood Plain	300	2-Year	Man100	268.00	16.30	18.80		18.84	0.002223	1.83	167.29	206.03	0.25	0.25
Flood Plain	300	2-Year	Man120	268.00	16.30	18.80		18.85	0.002305	1.71	168.38	206.41	0.23	0.23
Flood Plain	350	1-Year	ManCOB	137.00	17.50	18.70		18.74	0.002409	1.93	94.91	158.54	0.32	0.32
Flood Plain	350	1-Year	Man060	137.00	17.50	18.71		18.75	0.002376	1.86	96.15	159.26	0.30	0.30
Flood Plain	350	1-Year	Man080	137.00	17.50	18.72		18.75	0.002363	1.79	97.17	159.86	0.29	0.29
Flood Plain	350	1-Year	Man100	137.00	17.50	18.72		18.76	0.002360	1.73	98.10	160.39	0.28	0.28
Flood Plain	350	1-Year	Man120	137.00	17.50	18.73		18.76	0.002364	1.66	98.94	160.88	0.27	0.27
Flood Plain	350	2-Year	ManCOB	268.00	17.50	18.89		18.97	0.004271	2.80	125.96	175.78	0.43	0.43
Flood Plain	350	2-Year	Man060	268.00	17.50	18.90		18.98	0.004138	2.67	128.43	177.08	0.41	0.41
Flood Plain	350	2-Year	Man080	268.00	17.50	18.91		18.99	0.004070	2.55	130.30	178.06	0.39	0.39
Flood Plain	350	2-Year	Man100	268.00	17.50	18.92		19.00	0.004021	2.43	132.02	178.95	0.37	0.37
Flood Plain	350	2-Year	Man120	268.00	17.50	18.93		19.00	0.003987	2.32	133.57	179.76	0.35	0.35

HEC-RAS River: Coal Creek Reach: Flood Plain (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Flood Plain	400	1-Year	ManCOB	137.00	17.40	18.83		18.95	0.006481	3.24	61.19	97.22	0.53
Flood Plain	400	1-Year	Man080	137.00	17.40	18.85		18.95	0.006478	2.91	62.97	98.73	0.47
Flood Plain	400	1-Year	Man080	137.00	17.40	18.87		18.96	0.006932	2.70	64.63	100.12	0.44
Flood Plain	400	1-Year	Man100	137.00	17.40	18.88		18.97	0.007394	2.51	66.06	101.31	0.40
Flood Plain	400	1-Year	Man120	137.00	17.40	18.89		18.97	0.007847	2.34	67.28	102.32	0.37
Flood Plain	400	2-Year	ManCOB	268.00	17.40	19.11		19.32	0.009632	4.40	91.58	120.56	0.66
Flood Plain	400	2-Year	Man060	268.00	17.40	19.14		19.31	0.009322	3.84	94.68	122.69	0.57
Flood Plain	400	2-Year	Man080	268.00	17.40	19.16		19.31	0.009754	3.49	97.58	124.65	0.52
Flood Plain	400	2-Year	Man100	268.00	17.40	19.18		19.32	0.010213	3.19	99.92	126.20	0.47
Flood Plain	400	2-Year	Man120	268.00	17.40	19.19		19.33	0.010669	2.92	101.78	127.44	0.43
Flood Plain	450	1-Year	ManCOB	137.00	17.70	19.18		19.37	0.009526	4.00	50.90	64.80	0.64
Flood Plain	450	1-Year	Man060	137.00	17.70	19.19		19.37	0.009717	3.86	52.14	65.57	0.62
Flood Plain	450	1-Year	Man080	137.00	17.70	19.23		19.38	0.009506	3.64	54.51	67.01	0.57
Flood Plain	450	1-Year	Man100	137.00	17.70	19.26		19.40	0.009385	3.44	56.83	68.39	0.54
Flood Plain	450	1-Year	Man120	137.00	17.70	19.30		19.42	0.009343	3.25	59.02	69.67	0.50
Flood Plain	450	2-Year	ManCOB	268.00	17.70	19.58		19.88	0.011992	5.24	80.52	81.17	0.75
Flood Plain	450	2-Year	Man060	268.00	17.70	19.60		19.88	0.012446	5.03	82.21	82.01	0.71
Flood Plain	450	2-Year	Man080	268.00	17.70	19.65		19.88	0.012219	4.69	86.05	83.87	0.66
Flood Plain	450	2-Year	Man100	268.00	17.70	19.69		19.89	0.012076	4.37	89.79	85.66	0.60
Flood Plain	450	2-Year	Man120	268.00	17.70	19.73		19.91	0.012009	4.08	93.31	87.30	0.56
Flood Plain	495	1-Year	ManCOB	137.00	17.21	19.51	19.39	20.07	0.019287	5.96	22.97	16.18	0.88
Flood Plain	495	1-Year	Man060	137.00	17.21	19.56	19.39	20.08	0.019946	5.76	23.77	16.94	0.84
Flood Plain	495	1-Year	Man080	137.00	17.21	19.61	19.39	20.09	0.020946	5.58	24.73	22.74	0.80
Flood Plain	495	1-Year	Man100	137.00	17.21	19.66	19.39	20.11	0.021944	5.38	26.08	29.14	0.77
Flood Plain	495	1-Year	Man120	137.00	17.21	19.72	19.39	20.13	0.022874	5.17	27.83	35.76	0.73
Flood Plain	495	2-Year	ManCOB	268.00	17.21	20.27	20.27	20.40	0.005116	3.91	230.15	694.39	0.48
Flood Plain	495	2-Year	Man060	268.00	17.21	20.26	20.26	20.38	0.005915	3.87	223.54	694.39	0.47
Flood Plain	495	2-Year	Man080	268.00	17.21	20.26	20.26	20.37	0.006656	3.76	220.14	694.39	0.46
Flood Plain	495	2-Year	Man100	268.00	17.21	20.25	20.25	20.36	0.007673	3.71	214.27	694.39	0.45
Flood Plain	495	2-Year	Man120	268.00	17.21	20.25	20.24	20.35	0.007986	3.49	217.92	694.39	0.43
Flood Plain	519	1-Year	ManCOB	137.00	17.68	20.17	19.29	20.35	0.006374	3.38	40.58	26.04	0.48
Flood Plain	519	1-Year	Man060	137.00	17.68	20.24	19.29	20.32	0.004365	2.51	102.77	316.81	0.35
Flood Plain	519	1-Year	Man080	137.00	17.68	20.28	19.29	20.34	0.004505	2.23	115.48	335.16	0.31
Flood Plain	519	1-Year	Man100	137.00	17.68	20.32	19.29	20.36	0.004522	1.97	127.79	362.40	0.27
Flood Plain	519	1-Year	Man120	137.00	17.68	20.34	19.29	20.37	0.004516	1.76	138.64	383.35	0.24
Flood Plain	519	2-Year	ManCOB	268.00	17.68	20.40	20.06	20.55	0.006864	3.77	159.74	426.56	0.50
Flood Plain	519	2-Year	Man060	268.00	17.68	20.42	20.06	20.54	0.007077	3.44	172.28	462.29	0.45
Flood Plain	519	2-Year	Man080	268.00	17.68	20.46	20.06	20.54	0.007181	3.01	188.32	504.90	0.40
Flood Plain	519	2-Year	Man100	268.00	17.68	20.48	20.06	20.54	0.007348	2.68	200.02	522.48	0.35
Flood Plain	519	2-Year	Man120	268.00	17.68	20.49	20.06	20.54	0.007866	2.45	204.79	530.03	0.32

HEC-RAS River: Coal Creek Reach: Flood Plain (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Flood Plain	610.	1-Year	ManCOB	137.00	18.70	20.77	20.06	20.99	0.007488	3.82	40.43	34.08	0.48
Flood Plain	610.	1-Year	Man060	137.00	18.70	20.68	20.06	20.92	0.009151	4.04	37.21	32.95	0.52
Flood Plain	610.	1-Year	Man080	137.00	18.70	20.71	20.06	20.95	0.008987	3.96	38.45	33.39	0.51
Flood Plain	610.	1-Year	Man100	137.00	18.70	20.75	20.06	20.97	0.008961	3.89	39.49	33.76	0.49
Flood Plain	610.	1-Year	Man120	137.00	18.70	20.77	20.05	21.00	0.009014	3.83	40.43	34.09	0.48
Flood Plain	610.	2-Year	ManCOB	268.00	18.70	21.03	20.85	21.63	0.017928	6.42	49.57	37.12	0.76
Flood Plain	610.	2-Year	Man060	268.00	18.70	21.06	20.85	21.63	0.017039	6.24	50.71	37.49	0.74
Flood Plain	610.	2-Year	Man080	268.00	18.70	21.09	20.84	21.65	0.017281	6.19	51.80	38.11	0.73
Flood Plain	610.	2-Year	Man100	268.00	18.70	21.12	20.85	21.67	0.017395	6.10	53.13	39.49	0.71
Flood Plain	610.	2-Year	Man120	268.00	18.70	21.18	20.84	21.69	0.016893	5.94	55.24	41.43	0.68
Flood Plain	716	1-Year	ManCOB	137.00	16.04	21.08	17.49	21.14	0.000496	1.94	70.48	26.55	0.15
Flood Plain	716	1-Year	Man060	137.00	16.04	21.03	17.49	21.09	0.000516	1.97	69.66	26.41	0.16
Flood Plain	716	1-Year	Man080	137.00	16.04	21.05	17.49	21.11	0.000507	1.96	70.01	26.47	0.15
Flood Plain	716	1-Year	Man100	137.00	16.04	21.07	17.49	21.13	0.000500	1.95	70.31	26.52	0.15
Flood Plain	716	1-Year	Man120	137.00	16.04	21.09	17.49	21.15	0.000494	1.94	70.57	26.57	0.15
Flood Plain	716	2-Year	ManCOB	268.00	16.04	21.83	18.30	22.00	0.001198	3.31	80.91	28.36	0.24
Flood Plain	716	2-Year	Man060	268.00	16.04	21.82	18.30	21.99	0.001207	3.32	80.72	28.32	0.24
Flood Plain	716	2-Year	Man080	268.00	16.04	21.83	18.30	22.00	0.001194	3.31	80.98	28.38	0.24
Flood Plain	716	2-Year	Man100	268.00	16.04	21.85	18.30	22.02	0.001184	3.30	81.20	28.52	0.24
Flood Plain	716	2-Year	Man120	268.00	16.04	21.87	18.30	22.03	0.001172	3.29	81.43	28.73	0.24
Flood Plain	721			Culvert									
Flood Plain	771	1-Year	ManCOB	137.00	16.35	21.16	17.80	21.22	0.000372	2.04	67.18	36.65	0.16
Flood Plain	771	1-Year	Man060	137.00	16.35	21.10	17.80	21.17	0.000388	2.06	66.37	36.38	0.17
Flood Plain	771	1-Year	Man080	137.00	16.35	21.13	17.80	21.19	0.000381	2.05	66.72	36.50	0.17
Flood Plain	771	1-Year	Man100	137.00	16.35	21.15	17.80	21.21	0.000376	2.04	67.01	36.59	0.16
Flood Plain	771	1-Year	Man120	137.00	16.35	21.16	17.80	21.23	0.000371	2.04	67.27	36.68	0.16
Flood Plain	771	2-Year	ManCOB	268.00	16.35	22.11	18.61	22.29	0.000778	3.33	80.55	41.05	0.24
Flood Plain	771	2-Year	Man060	268.00	16.35	22.10	18.61	22.27	0.000784	3.34	80.36	40.99	0.25
Flood Plain	771	2-Year	Man080	268.00	16.35	22.12	18.61	22.29	0.000776	3.32	80.63	41.07	0.24
Flood Plain	771	2-Year	Man100	268.00	16.35	22.13	18.61	22.30	0.000769	3.32	80.84	41.15	0.24
Flood Plain	771	2-Year	Man120	268.00	16.35	22.15	18.61	22.32	0.000761	3.31	81.08	41.22	0.24
Flood Plain	828.	1-Year	ManCOB	137.00	18.12	21.03	20.12	21.36	0.006896	4.64	29.69	13.10	0.52
Flood Plain	828.	1-Year	Man060	137.00	18.12	20.96	20.12	21.31	0.007509	4.77	28.83	12.77	0.54
Flood Plain	828.	1-Year	Man080	137.00	18.12	20.99	20.12	21.33	0.007236	4.71	29.20	12.91	0.53
Flood Plain	828.	1-Year	Man100	137.00	18.12	21.01	20.12	21.35	0.007018	4.66	29.51	13.03	0.52
Flood Plain	828.	1-Year	Man120	137.00	18.12	21.03	20.12	21.36	0.006829	4.62	29.80	13.14	0.51
Flood Plain	828.	2-Year	ManCOB	268.00	18.12	21.87	21.06	22.55	0.009841	6.66	43.53	20.70	0.64
Flood Plain	828.	2-Year	Man060	268.00	18.12	21.85	21.06	22.54	0.010040	6.70	43.16	20.50	0.65
Flood Plain	828.	2-Year	Man080	268.00	18.12	21.88	21.06	22.55	0.009761	6.64	43.69	20.78	0.64
Flood Plain	828.	2-Year	Man100	268.00	18.12	21.90	21.06	22.56	0.009549	6.60	44.11	20.99	0.63

HEC-RAS River: Coal Creek Reach: Flood Plain (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Flood Plain	828	2-Year	Man120	268.00	18.12	21.92	21.06	22.57	0.009319	6.55	44.59	21.24	0.63
Flood Plain	932	1-Year	ManCOB	137.00	20.02	22.00	21.71	22.42	0.015275	5.21	26.74	19.04	0.73
Flood Plain	932	1-Year	Man060	137.00	20.02	22.00	21.71	22.42	0.015275	5.21	26.74	19.04	0.73
Flood Plain	932	1-Year	Man080	137.00	20.02	22.00	21.71	22.41	0.015286	5.21	26.73	19.04	0.73
Flood Plain	932	1-Year	Man100	137.00	20.02	22.00	21.71	22.41	0.015282	5.21	26.73	19.04	0.73
Flood Plain	932	1-Year	Man120	137.00	20.02	22.00	21.71	22.42	0.015268	5.21	26.74	19.05	0.73
Flood Plain	932	2-Year	ManCOB	268.00	20.02	23.07	22.46	23.57	0.009502	5.81	50.52	25.31	0.63
Flood Plain	932	2-Year	Man060	268.00	20.02	23.07	22.46	23.57	0.009483	5.81	50.56	25.31	0.63
Flood Plain	932	2-Year	Man080	268.00	20.02	23.07	22.46	23.57	0.009509	5.82	50.51	25.30	0.63
Flood Plain	932	2-Year	Man100	268.00	20.02	23.07	22.46	23.57	0.009527	5.82	50.47	25.29	0.63
Flood Plain	932	2-Year	Man120	268.00	20.02	23.07	22.46	23.57	0.009545	5.82	50.44	25.29	0.63
Flood Plain	1042	1-Year	ManCOB	137.00	20.95	23.24	22.55	23.48	0.006477	3.92	36.58	24.30	0.50
Flood Plain	1042	1-Year	Man060	137.00	20.95	23.24	22.55	23.48	0.006463	3.92	36.61	24.31	0.50
Flood Plain	1042	1-Year	Man080	137.00	20.95	23.24	22.55	23.48	0.006467	3.92	36.60	24.30	0.50
Flood Plain	1042	1-Year	Man100	137.00	20.95	23.24	22.55	23.48	0.006473	3.92	36.59	24.30	0.50
Flood Plain	1042	1-Year	Man120	137.00	20.95	23.24	22.55	23.48	0.006479	3.92	36.58	24.29	0.50
Flood Plain	1042	2-Year	ManCOB	268.00	20.95	24.08	23.27	24.46	0.006803	5.12	60.02	31.41	0.55
Flood Plain	1042	2-Year	Man060	268.00	20.95	24.08	23.27	24.46	0.006787	5.11	60.08	31.42	0.55
Flood Plain	1042	2-Year	Man080	268.00	20.95	24.08	23.27	24.46	0.006801	5.12	60.03	31.42	0.55
Flood Plain	1042	2-Year	Man100	268.00	20.95	24.08	23.27	24.46	0.006797	5.12	60.04	31.42	0.55
Flood Plain	1042	2-Year	Man120	268.00	20.95	24.08	23.27	24.46	0.006793	5.12	60.06	31.42	0.55
Flood Plain	1130	1-Year	ManCOB	137.00	21.65	23.88	23.24	24.14	0.006812	4.19	35.62	25.82	0.53
Flood Plain	1130	1-Year	Man060	137.00	21.65	23.88	23.24	24.14	0.006810	4.19	35.62	25.82	0.53
Flood Plain	1130	1-Year	Man080	137.00	21.65	23.88	23.24	24.14	0.006810	4.19	35.62	25.82	0.53
Flood Plain	1130	1-Year	Man100	137.00	21.65	23.88	23.24	24.14	0.006811	4.19	35.62	25.82	0.53
Flood Plain	1130	1-Year	Man120	137.00	21.65	23.88	23.24	24.14	0.006812	4.19	35.62	25.82	0.53
Flood Plain	1130	2-Year	ManCOB	268.00	21.65	24.74	24.03	25.14	0.006692	5.30	61.41	33.99	0.56
Flood Plain	1130	2-Year	Man060	268.00	21.65	24.74	24.03	25.14	0.006686	5.30	61.42	33.99	0.56
Flood Plain	1130	2-Year	Man080	268.00	21.65	24.74	24.03	25.14	0.006692	5.30	61.41	33.99	0.56
Flood Plain	1130	2-Year	Man100	268.00	21.65	24.74	24.03	25.14	0.006691	5.30	61.41	33.99	0.56
Flood Plain	1130	2-Year	Man120	268.00	21.65	24.74	24.03	25.14	0.006690	5.30	61.41	33.99	0.56
Flood Plain	1161	1-Year	ManCOB	137.00	19.35	24.15	20.79	24.22	0.006696	2.02	67.71	30.15	0.16
Flood Plain	1161	1-Year	Man060	137.00	19.35	24.15	20.79	24.22	0.006696	2.02	67.71	30.15	0.16
Flood Plain	1161	1-Year	Man080	137.00	19.35	24.15	20.79	24.22	0.006696	2.02	67.71	30.15	0.16
Flood Plain	1161	1-Year	Man100	137.00	19.35	24.15	20.79	24.22	0.006696	2.02	67.71	30.15	0.16
Flood Plain	1161	1-Year	Man120	137.00	19.35	24.15	20.79	24.22	0.006696	2.02	67.71	30.15	0.16
Flood Plain	1161	2-Year	ManCOB	268.00	19.35	25.08	21.59	25.25	0.001479	3.32	80.76	33.52	0.24
Flood Plain	1161	2-Year	Man060	268.00	19.35	25.08	21.59	25.25	0.001479	3.32	80.77	33.52	0.24
Flood Plain	1161	2-Year	Man080	268.00	19.35	25.08	21.59	25.25	0.001479	3.32	80.76	33.52	0.24
Flood Plain	1161	2-Year	Man100	268.00	19.35	25.08	21.59	25.25	0.001479	3.32	80.76	33.52	0.24
Flood Plain	1161	2-Year	Man120	268.00	19.35	25.08	21.59	25.25	0.001479	3.32	80.76	33.52	0.24

HEC-RAS River: Coal Creek Reach: Flood Plain (Continued)

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl
Flood Plain	1161	2-Year	Man120	268.00	19.35	25.08	21.59	25.25	0.001479	3.32	80.76	33.52	0.24	
Flood Plain	1171		Culvert											
Flood Plain	1218	1-Year	ManCOB	137.00	19.49	24.23	20.93	24.30	0.000484	2.05	66.82	20.55	0.17	
Flood Plain	1218	1-Year	Man060	137.00	19.49	24.23	20.93	24.30	0.000484	2.05	66.82	20.55	0.17	
Flood Plain	1218	1-Year	Man080	137.00	19.49	24.23	20.93	24.30	0.000484	2.05	66.82	20.55	0.17	
Flood Plain	1218	1-Year	Man100	137.00	19.49	24.23	20.93	24.30	0.000484	2.05	66.82	20.55	0.17	
Flood Plain	1218	1-Year	Man120	137.00	19.49	24.23	20.93	24.30	0.000484	2.05	66.82	20.55	0.17	
Flood Plain	1218	2-Year	ManCOB	268.00	19.49	25.37	21.73	25.54	0.000903	3.23	82.90	24.99	0.23	
Flood Plain	1218	2-Year	Man060	268.00	19.49	25.37	21.73	25.54	0.000903	3.23	82.90	24.99	0.23	
Flood Plain	1218	2-Year	Man080	268.00	19.49	25.37	21.73	25.54	0.000903	3.23	82.90	24.99	0.23	
Flood Plain	1218	2-Year	Man100	268.00	19.49	25.37	21.73	25.54	0.000903	3.23	82.90	24.99	0.23	
Flood Plain	1218	2-Year	Man120	268.00	19.49	25.37	21.73	25.54	0.000903	3.23	82.90	24.99	0.23	
Flood Plain	1307	1-Year	ManCOB	137.00	22.44	23.99	23.91	24.59	0.020100	6.21	22.06	15.74	0.92	
Flood Plain	1307	1-Year	Man060	137.00	22.44	23.99	23.91	24.59	0.020093	6.21	22.07	15.74	0.92	
Flood Plain	1307	1-Year	Man080	137.00	22.44	23.99	23.91	24.59	0.020095	6.21	22.07	15.74	0.92	
Flood Plain	1307	1-Year	Man100	137.00	22.44	23.99	23.91	24.59	0.020098	6.21	22.06	15.74	0.92	
Flood Plain	1307	1-Year	Man120	137.00	22.44	23.99	23.91	24.59	0.020102	6.21	22.06	15.74	0.92	
Flood Plain	1307	2-Year	ManCOB	268.00	22.44	25.27	24.70	25.85	0.008909	6.16	45.61	22.89	0.67	
Flood Plain	1307	2-Year	Man060	268.00	22.44	25.27	24.70	25.85	0.008905	6.16	45.61	22.89	0.67	
Flood Plain	1307	2-Year	Man080	268.00	22.44	25.27	24.70	25.85	0.008909	6.16	45.61	22.89	0.67	
Flood Plain	1307	2-Year	Man100	268.00	22.44	25.27	24.70	25.85	0.008908	6.16	45.61	22.89	0.67	
Flood Plain	1307	2-Year	Man120	268.00	22.44	25.27	24.70	25.85	0.008907	6.16	45.61	22.89	0.67	
Flood Plain	1404	1-Year	ManCOB	137.00	22.71	25.25	24.50	25.52	0.005316	4.25	34.26	19.71	0.51	
Flood Plain	1404	1-Year	Man060	137.00	22.71	25.25	24.50	25.52	0.005317	4.25	34.26	19.71	0.51	
Flood Plain	1404	1-Year	Man080	137.00	22.71	25.25	24.50	25.52	0.005317	4.25	34.26	19.71	0.51	
Flood Plain	1404	1-Year	Man100	137.00	22.71	25.25	24.50	25.52	0.005316	4.25	34.26	19.71	0.51	
Flood Plain	1404	1-Year	Man120	137.00	22.71	25.25	24.50	25.52	0.005316	4.25	34.26	19.71	0.51	
Flood Plain	1404	2-Year	ManCOB	268.00	22.71	26.10	25.28	26.57	0.006123	5.69	54.82	28.79	0.58	
Flood Plain	1404	2-Year	Man060	268.00	22.71	26.10	25.28	26.57	0.006123	5.69	54.82	28.79	0.58	
Flood Plain	1404	2-Year	Man080	268.00	22.71	26.10	25.28	26.57	0.006123	5.69	54.82	28.79	0.58	
Flood Plain	1404	2-Year	Man100	268.00	22.71	26.10	25.28	26.57	0.006123	5.69	54.82	28.79	0.58	
Flood Plain	1404	2-Year	Man120	268.00	22.71	26.10	25.28	26.57	0.006123	5.69	54.82	28.79	0.58	
Flood Plain	1505	1-Year	ManCOB	137.00	23.61	25.85	25.25	26.14	0.007032	4.32	31.74	18.22	0.57	
Flood Plain	1505	1-Year	Man060	137.00	23.61	25.85	25.25	26.14	0.007032	4.32	31.74	18.22	0.57	
Flood Plain	1505	1-Year	Man080	137.00	23.61	25.85	25.25	26.14	0.007032	4.32	31.74	18.22	0.57	
Flood Plain	1505	1-Year	Man100	137.00	23.61	25.85	25.25	26.14	0.007032	4.32	31.74	18.22	0.57	
Flood Plain	1505	1-Year	Man120	137.00	23.61	25.85	25.25	26.14	0.007032	4.32	31.74	18.22	0.57	
Flood Plain	1505	2-Year	ManCOB	268.00	23.61	26.75	25.99	27.23	0.006975	5.54	49.62	21.90	0.60	
Flood Plain	1505	2-Year	Man060	268.00	23.61	26.75	25.99	27.23	0.006975	5.54	49.62	21.90	0.60	