



INSTREAM PROJECT DESIGN CHECKLIST

For Design and Construction of Flood and Erosion Protection Facilities and Habitat Restoration Projects that May Include Large Wood Placement or Natural Wood Recruitment

Project Name: Shake Mill Right Bank Levee Repair

Project Manager: Linda Bartolini Venegas

River/River Mile/Bank: North Fork Snoqualmie River (RM 0.3 Right Bank, RM 0.4 Left Bank)

Date: April 20, 2020

Check one or both:

Project includes placement of large wood elements

Project may influence the recruitment, mobility and accumulation of natural large wood.

Note: If the project is comprised of emergency work, then fill out and file this form within 30 days of completion of emergency work.

I. Project Background and Preliminary Design (30-40 Percent) Information

(Provide general information at a conceptual level)

1. Describe the overall river management context, strategy and objectives for the river reach. Refer to pertinent plans, policies or documents pertaining to flood hazards, salmon recovery, etc.

River management approaches in this river reach are informed by several plans and related documents that provide context for flood hazard management, salmon recovery, and agriculture.

- This project is consistent with the alternatives for managing King County's flood protection facilities in the adopted 2006 King County Flood Hazard Management Plan (updated in 2013).
- The Snohomish River Basin Salmon Conservation Plan (2005) provides a snapshot of the salmon recovery strategy for sub-basins of the Snoqualmie River above Snoqualmie Falls on pages 11-81-84. The highest ecological recovery need for this area is preserving habitat for hydrologic and sediment processes.

2. Describe the goals and objectives of the project and its relative importance to the success of DNRP program goals and mandates. Identify funding source(s) and describe any applicable requirements or constraints.

The Shake Mill Right Bank Levee Repair Project will repair up to 80 feet of damage on the Shake Mill Right Bank levee on the North Fork Snoqualmie River between the mouth of Tate Creek and the North Fork Bridge. The Shake Mill Right Bank levee protects a heavily used county road (428th Avenue SE) and a county bridge (North Fork Bridge 122i). If left unrepaired, these damages could worsen or the levee could fail, which presents risk to the bridge and roadway.

A companion action will remove existing bank armoring at the Shake Mill Left Bank setback revetment, in the reach upstream of the project site. 330 cubic yards of rock will be removed, which will restore natural geomorphic processes. The rock removal will require that 20 trees be removed; these trees will be placed in the channel, providing opportunities for in-stream habitat development for trout and other riverine fauna.

The project is funded by the King County Flood Control District.

3. Describe the existing (and historic, if relevant) site and reach conditions, including structural features, channel form, and the presence of naturally-deposited large wood. Describe known utilization by salmonids and any important or unique biological or ecological attributes.

The project site is located along the North Fork Snoqualmie River. The repair is located on the right (north) riverbank, adjacent to the North Fork Bridge. The Shake Mill Right Bank levee is an earthen levee with a riprap toe and face that was constructed in 1961. This levee functions as channel training facility to direct river flows perpendicularly through the North Fork Bridge (Bridge 122i). The levee also directly protects 428th Avenue SE (a King County road) and the North Fork Bridge from flooding and channel migration. The companion project is located on the left (south) riverbank, on a parcel purchased by King County RFMS in 2012. A buried setback revetment was constructed in 2019 on the left bank downstream of the companion project to reduce risk to the adjacent county infrastructure.

There is currently an accumulation of naturally occurring large wood throughout the North Fork River Channel adjacent to the site. This wood is from upstream sources and accumulates periodically at the site; some of this naturally occurring large wood is deposited along the gravel bar across from the Shake Mill Left Bank revetment. Most of this wood is transitory and will be transported downstream, after temporary accumulation within the project area. Approximately 1.0 mile downstream, immediately upstream of the Reinig Road Revetment, rapidly changing channel conditions and a lack of constructed protections causes the left bank of the river to actively retreat into the adjacent floodplain forest of large cottonwood and big-leaf maple trees. Consequently, many of these large trees have and continue to fall into the river channel, creating a substantial accumulation of natural wood.

The North Fork Snoqualmie River is a Type S (Shoreline) stream under King County's stream classification system. This river reach is geomorphically dynamic and subject to ongoing channel migration. An examination of historic aerial photos and LiDAR imagery provide strong evidence that this area of the upper Snoqualmie River valley has a long history of ongoing river channel changes. Tate Creek, a Type F (Fish) tributary stream, drains from the north into the North Fork Snoqualmie River immediately across from the project area. The project site is located above Snoqualmie Falls. Anadromous salmon are not present above Snoqualmie Falls. Several species of trout are documented above the Falls, including coastal cutthroat trout (*Oncorhynchus clarki, clarki*), rainbow trout (*O. mykiss*), westslope cutthroat trout (*O. clarki lewisi*), hybrid or unidentified Pacific trout *Oncorhynchus* species (Onxx), eastern brook trout (*Salvelinus fontinalis*) and mountain whitefish (*Prosopium williamsoni*).

4. Describe what is known about adjacent land uses and the type, frequency, and seasonality of recreational uses in the project area. Are there nearby trail corridors, schools or parks? What is the source(s) of your information?

The surrounding properties are predominantly low density rural residential with a mix of pasture and forest. The land cover is predominantly pasture, blackberry, reed canary grass, and scattered native conifer and deciduous trees. Two largely forested parcels immediately adjacent to the project site are owned by King County Parks and contain a segment of the North Fork Snoqualmie River. Approximately, 1400 feet downstream of the project, the North Fork Snoqualmie joins the Middle Fork Snoqualmie River in the King County-owned Three Forks Natural Area.

According to the King County 2013 River Recreation Study, this reach experiences infrequent use by all categories of recreationists. Approximately nine out of 10 floaters observed in the Snoqualmie River system were observed in the reach of the mainstem between Snoqualmie Falls and Fall City. Fewer than 2 percent of all floaters were observed in all other reaches of the river system, including the reach affected by this project (Synthesis of 2013 River Recreation Study, prepared by Herrera Environmental Consultants for King County, 2014).

5. If the project includes wood placement, describe the conceptual design of large wood elements of the project, including, if known at this stage in the design, the amount, size, location, orientation, elevation, anchoring techniques, and type of interaction with the river and stream at a range of flows.

This project consists of two primary components: a repair to approximately 80-feet of damage on the Shake Mill Right Bank Levee and a companion action to remove remnant angular rock at Shake Mill Left Bank.

The repair at right bank does not include any large wood incorporated into the design. The repair will be large rock at the toe and willow stakes and trees planted on the upper bank. There are up to 10 trees currently on the bank that may be removed to repair the rock levee; eight of those trees are snags.

The rock removal at left bank will require the removal of up to 20 trees (19 small red alders and one black cottonwood). The removed trees will be placed, unanchored, into the adjacent channel. Most of the trees have trunks that are 4-8 inches in diameter at breast height (DBH) with the exception of a few measuring over 12 inches DBH. The exact location that the wood will be placed will be determined during construction by the Project Ecologist and Project Engineer. The wood will be placed approximately parallel to the bank in the side channel.

6. If the project includes wood placement, what is the intended structural, ecological or hydraulic function of the placed wood? What role does the placed wood have in meeting the project's goals and objectives? Is the project intended to recruit or trap additional large wood that may be floating in the river?

The wood placement is intended to serve an ecological function as fish habitat. Ecological functions include:

- Increased structural complexity of riverine habitat.
- Increase shading and refuge for wildlife and fish.

The wood to be placed are all small diameter (<12") and are not expected to trap or recruit additional wood accumulations.

7. Is the project likely to affect the recruitment, mobility or accumulation of natural large wood, e.g., by encouraging wood deposition on or near the site or promoting bank erosion that may cause tree toppling? Describe expected site evolution and its potential effects on natural wood dynamics.

Current patterns of wood mobility or accumulation are not likely to change as a result of the project. The majority of the wood will be placed in a side channel with low flows and is not anticipated to affect natural wood accumulation. The two trees that will be placed closer to the confluence with the North Fork Snoqualmie River will not be anchored and it is not expected for the wood to remain in place at the project site beyond the first major flood.

8. Describe how public safety considerations have been incorporated into the preliminary project design. For placed wood, address each of the considerations:

- Type, frequency, and seasonality of recreational use:** According to the King County 2013 River Recreation Study, this reach experiences infrequent use by recreationists.
- Wood location, positioning, and anchoring techniques:** Wood will not be anchored. It will be placed immediately adjacent to the bank, approximately parallel to shore.
- Maximizing achievement of project goals and objectives while minimizing potential public safety risks:** The wood will be placed in a low flow side channel adjacent to the main stem of the river and is not expected to change the background wood loading in the system.
- Use of established and recognized engineering, geological, and ecological expertise:** Professional engineers, geologists and ecologists have been involved in design and review of the project. The methods used to design this project are consistent with best professional practices.

9. Has the project been reviewed and approved by a Licensed Professional Civil Engineer? Please list other licensed technical staff who have reviewed and provided input on the design (e.g., Licensed Geologist and Licensed Engineering Geologist). Specify the Engineer of Record for the design and any other Licensed Professionals who have sealed their portion of the design plans. Were all reviews and approvals completed?

Yes. Mark Beggs (Engineer of Record) Jessy Hardy (Engineer in Training) and Mark Ruebel (Professional Engineer) designed the levee repair and will oversee the wood placement. The project is currently at 30% design. All design reviews and approvals have been completed.

- 10. Has the project been reviewed and approved by a King County Professional Ecologist (e.g., person with an advanced degree in aquatic and/or biological sciences from an accredited university or equivalent level of experience) if ecological benefits are an intended project objective, to evaluate the consistency of the design with project goals, existing environmental policies and regulations, and expected or known permit conditions? Specify the Reviewing Ecologist for the project. Was this review and approval completed? What is the anticipated schedule for completing project milestones (30-40% design, final design, major construction/earthmoving) and for soliciting public input)?**

Seth Amrhein, Project Ecologist, approved of the levee repair design and placement of the wood. The project is currently at 30% design. The anticipated project construction date is September 2020.

<u><i>Linda Bartolini Venegas</i></u>	4-20-20
Project Manager	Date
<u><i>Mark Ruebel PE</i></u>	
Mark Ruebel PE (Apr 21, 2020)	
Supervising Engineer, Project Supervisor or Unit Manager	Date