

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 Clough Creek Off-Channel Sediment Facility_____ Project Manager Wendy Kara, Engineer III_____

River/River Mile/Bank Clough Creek/RM 1.2/Right Bank Date 4/6/15

Check one or both:

- X Project includes placement of large wood elements
- X Project may influence the recruitment, mobility and accumulation of natural large wood.

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. :

Clough Creek is a small tributary to the S. Fork Snoqualmie River above Snoqualmie Falls. There is no river management context for this project, as it is directed at reducing excessive sedimentation and local flooding of the creek with an off channel sediment pond. There is no salmon recovery plan above Snoqualmie Falls, other than restoring and improving the recreational fishery for resident trout.

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 main goal of the project is to reduce the amount of excessive sediment in the stream to reduce overbank flood events which have damaged homes, yards, buildings, roads, and utility infrastructure. It addresses the County mandate to control flooding and protect life and safety. One of the roads flooded is sole access to 30 residents and public water supplies. Funding sources are— FEMA and State Hazard Mitigation Grant Programs, Limited Tax General Obligation Bonds-2014-Serives B, and Surface Water Management Fee (SWM) funds. We are constrained by the area of land that could be purchased for the pond, and the fact that it will not be possible to contain 100% of the sediment supply. Some events have been debris torrents that were initiated high on the hillsides by failing culverts and road fills.

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 on a classic alluvial fan at the toe of steep slopes. Within this highly depositional environment, the bulk of human development has occurred. The historic channel would likely have been highly mobile, with multiple braided channels migrating laterally over the alluvial fan. Many man caused alterations have relocated and channelized Clough Creek into a single undersized channel with several hydraulic restrictions such as triple 4-foot diameter culverts at 415th, a 90-degree turn under a short span bridge on 415th, and extremely long culverts under 6 divided lanes under I-90. Extensive channel dredging of sediments has occurred on a frequent basis adjacent to and in the vicinity of the 415th crossings, forming less than ideal channel bed conditions. The one fairly intact reach is just upstream of I-90 for about 600 feet on a single wooded parcel. This reach contains trout spawning gravel beds, pools, riffles, instream and overhead cover, and fairly intact riparian forested buffers.

Clough Creek is documented by WDFW as the most densely spawned tributary in the entire upper Snoqualmie drainage for resident trout. 15 redd counts in 2010 found 104 trout redds both upstream and downstream of the

proposed project site. The gravel quantity and quality, along with high water quality appear to contribute to high quality trout spawning habitat.

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?

There are three stream side rural residential homes upstream of the project site, and several downstream, although at a very low density. The one residence on the project site will be demolished. The residence adjacent to the project site upstream has a foot bridge over the creek that accesses property across the creek which includes a large play structure. The residents have been observed to build a cobble/boulder pool in the creek just below the bridge during summer low flow. Small children have been observed playing at the edge of the creek at low flow, supervised by adults at the home adjacent to (upstream of) the project site. At any flow below 30 cfs the off-channel sediment facility will have no inflow and not be operating.

There are no nearby trail corridors, schools, or parks.

There is no known recreational floating or boating on Clough Creek as summer low flows are about 1 to 2 cfs in a fairly wide channel and there are numerous obstructions, such as the seasonal cobble dam upstream of the project, three 4-foot diameter parallel culverts under 415th, a short span bridge on 415th, the I-90 culverts, and large swaths of private property along the stream's course. The headwaters are all private timberland and extremely steep deep V shoots coming off the face of Rattlesnake Ridge.

Clough Creek flows directly adjacent and parallel to 415th and as such has full access to neighborhood residents. This is downstream of the project site. No recreational use of this reach has ever been observed, but one cobble dam remnants were noted in March 2015 along 415th, indicating some wading use of the creek here.

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.

The project will place up to 20 pieces of LWD in contact with the creeks low flow channel for two purposes. First, up to three "digger logs" without rootwads will be anchored in place at the entrance to the sediment facility, with the ends angled down and buried in the streambed. These will assist in diverting flow and sediment into the facility. Second, additional LWD with rootwads will be anchored into the bank in trenches and buried in rock and soil and extend into the stream to provide instream habitat as mitigation elements for impacts of the project. Please see the plans for orientation of the LWD to the channel, and size dimensions. Most of this LWD will be sourced from trees on site.

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 LWD with rootwads are intended to provide both bank stability, and overhead and instream fish cover and scour pools for rearing and holding resident trout.

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.

The project is not expected to affect the recruitment or mobility of existing natural large wood. The project may slightly affect the accumulation of natural large wood on the rootwads that are proposed for placement. This natural large wood currently accumulated at the entrance to the triple 4-foot diameter culverts and can plug some or all culverts, which has caused Clough Creek to leave its channel and flow over the sole access segment of 415th. The "digger logs" are being specifically designed and oriented to reduce or eliminate accumulation of natural large wood. It is more likely that the rootwads will accumulate small natural wood that will benefit aquatic organisms, while the larger chunky wood will likely still plug the triple tubes. Some large natural wood will also likely flow into the sediment pond and be trapped and removed from the system, particularly in a debris torrent or very high flow.

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

a. Type, frequency, and seasonality of recreational use;

If there is any recreational use, it is likely in the summer at the seasonal low flow period of one or two cfs. The facility will not operate or divert any flow in this season. The creek is so shallow at this season that the placed LWD with root wads are not anticipated to have any effect on public safety.

b. Wood location, positioning, and anchoring techniques;

The digger logs with not have branches, will be removable as an adaptive management technique, are angled steeply into the bed, and will not extend more than about 35% of the width of the channel. The LWD with rootwads will be mostly buried, and also will not extend across the creek channel.

c. Maximizing achievement of project goals and objectives while minimizing potential public safety risks;

The digger logs are at the outside bend of the stream, and are designed to encourage debris to enter the sediment pond, where the velocities will be much lower. Without the sediment facility and associated wood, anything floating down the stream would be pushed up against the culverts immediately downstream. The sediment pond would be an easier location to exit the stream than the culverts.

d. Use of established and recognized engineering, geological, and ecological expertise.

The project team consists of two geologists and two geotechnical staff, two Professional Ecologists, and two Senior Engineers. The project has also been reviewed and approved with an HPA by a WDFW staff biologist (Assistant Director of Region 4).

9. Has the project been reviewed and approved by a Licensed Professional Civil Engineer (P.E.)? 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?

The following staff have all worked on this project and contributed to the design plans, which have not yet been approved and stamped. Wendy Kara, P.E., Project Manager and Engineer of Record; Tim Kelly, P.E., Senior Engineer; Grant Smith, Environmental Scientist III; Don Finney, Environmental Scientist III; John Bethel, Geologist; and Bob Pendergast, Professional Licensed Surveyor.

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)?

Yes two Professional Ecologists have reviewed and approved the project, in a tag team format due to varying availability. The project had not yet reached 30% design. Soliciting public input for this small stream appears to be overkill for public safety. Through the Corps Nationwide permit process, we have received public and Tribal input that is ongoing.

<u>Wendy Kara</u>	<u>6-18-15</u>
Project Manager	Date
<u>Lorraine Lai</u>	<u>6-18-15</u>
Supervising Engineer, Project Supervisor or Unit Manager	Date