King County

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 Lower Miller Floodplain Restoration Project Project Manager Chris Ewing

River/River Mile/Bank Miller River, RM 0.5, both banks Date 7/1/2026

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.

   The Project reach has been identified in several planning documents as a location with high potential for providing lasting salmonid habitat function in the Snohomish Basin, including the Snohomish Basin Salmon Conservation Plan (SBSRF 2005); U.S. Forest Service Miller-Foss Watershed Analysis (USFS 2009); Restoration Opportunity Report: South Fork Skykomish River Basin Restoration Feasibility Project (Herrera 2013a); Snohomish Basin Protection Plan (SBSRF 2015); and Watershed Restoration and Enhancement Plan, WRIA 7, Snohomish Watershed (Ecology 2024).

   Floodplain management efforts are focused on reducing risks from flooding and channel migration and to support resilient, viable communities; to achieve multi-benefit flood risk reduction outcomes that preserve, restore, and enhance the natural functions of flood-prone areas; and to implement flood risk reduction solutions that are comprehensive, community based, climate resilient, and that reduce long-term costs of flood risk reduction (KC 2024).

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 project goals are to maximize habitat uplift for salmonids in the lower mile of the Miller River and to reduce flood risks to private property and infrastructure. The design objectives are to:

   - Increase the quantity of frequently connected off-channel, rearing habitat.
   - Increase the quantity of main channel spawning and rearing habitat.
   - Promote dynamic fluvial processes by removing channel migration constraints and adding roughness and hydraulic complexity.
   - Improve public safety by removing damaged infrastructure.
   - Mitigate risk to remaining infrastructure that may increase because of project actions.

   The updated 2024 King County Flood Management Plan was developed to align with integrated floodplain management principles. A core component of integrated floodplain management is to improve the resilience of floodplains for community needs and the health of the environment by embracing comprehensive and collaborative solutions. The project does this by looking at habitat restoration and flood protection possibilities throughout the lower mile-long reach of the Miller River.

   The project is funded by King County Surface Water Management funds, along with various state and local grants.

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 approximately 120 acres and bounded by the South Fork Skykomish River to the north, Miller River Road to the west, Miller Road Protection Revetment to the south, and natural valley walls to the east. The Project area encompasses most of the Miller River floodplain as it joins the South Fork Skykomish River.

   The Miller River is primarily a single-thread, riffle-glide, gravel-based system surrounded by a historical floodplain. The river has changed over time from a multi- to single-thread channel through a combination of human actions (bridges, roads, levees, and revetments). Four primary meander bends, cut off by floods, are now high-flow side channels with minimal seasonal, surface water connectivity to the main channel. There is a lack of naturally deposited large wood due to logging activities beginning 150 years ago. Most of the wood that moves through the system is too small to be deposited into the project reach.

   In recent years Chinook, coho, and pink salmon as well as steelhead, bull, and rainbow trout have been documented within the lower 4 miles of the Miller River. pink salmon have been specifically documented spawning in the main stem Miller River at river mile 2.4, upstream of the project area.

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?

   East of the project area is an inactive quarry. North of the project area is the BNSF railway. West of the project area is a mix of private and public parcels with minimal development, west of that is the Miller River Road NE, and west of the road is the residential Money Creek Park community.

   Recreational use of the Miller River was not cited by respondents of surveys conducted by King County in 2009 and 2013, but wading and swimming near the Old Cascade Highway washout site have been observed by County staff during summer months. The river also sees occasional trout and salmon fishing. Much of the Miller River watershed sits at a high elevation and thus its hydrology is heavily influenced by snow fall and melt. The project reach experiences extreme low flow in the summer (mid-July to late-September) when flows typically range between 20 to 50 cfs and the channel bed goes dry in places (USFS 2009). Unskilled recreational use (e.g., floaters) is rare on the Miller River due to these low flow conditions, as well as limited access and the relative remoteness of the river from population centers.

   The Miller River is a major tributary to the Skykomish River and is used infrequently by the whitewater community (King County 2009). The East and West Forks of the Miller River are included in American Whitewater's river guides with Class V and Class V+ ratings, respectively, and are runnable during moderate flow conditions (fall rains and the spring snow melt). The American Whitewater website currently shows put-in locations about 4 miles upstream of the project site on each of the forks and a takeout location at the NE Old Cascade Highway bridge/washed out road in the project area. Other whitewater guides (professorpaddle.com) recommend a takeout at the Miller River Group Camp about 1.5 miles upstream of the project area.

   Additional outreach will be conducted by the project team between 30% and 60% design to gather information about recreational uses of the project site.

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.

   There will be approximately 50 large wood structures placed in the project area, ranging from small habitat-scale jams to large, engineered log structures (up to 60 feet wide). Roughly half of these structures (~25) will be large post-supported ELJs constructed in the main channel between RM 0.3 and 0.7 of the Miller River. The structures will have upstream oriented rootwads and will be backfilled with river alluvium and slash material so that they have very low porosity. This is intended to reduce straining hazards in the as-built condition. These structures are expected to develop deep pools on the upstream side and gravel bars on the downstream side. They are intended to interact with flow throughout the year, including during summer low flow periods.

   The remainder of the placed wood will be relatively small complexes of logs with rootwads in off-channel areas. These will be stabilized by embedment into banks or channel beds, or by bearing on standing trees. These are also intended to

interact with flow throughout the year, but off-channel areas may become hydraulically disconnected from the main channel during summer months.

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 large engineering log structures will support the project goal of maximizing habitat uplift for salmonids by:

   - Increasing floodplain engagement through the addition of hydraulic roughness and obstructions in the main channel;
   - Creating hydraulic diversity in the main channel to sort gravel and provide deep holding zones.
   - Promoting dynamic river processes such as channel migration and wood capture and retention.

   The design of habitat wood jams is still under development, but they are intended to provide a local ecological benefit by providing cover and hydraulic diversity in off-channel areas, particularly for juvenile salmonids.

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.

   This reach of the Miller River is highly dynamic and is prone to bank erosion and channel avulsion, which has historically recruited large quantities of large wood. The project will likely increase channel migration rates by removing barriers like the road and levee, and encouraging sediment deposition around engineered log structures. The log structures may also trap and retain wood from the watershed that would otherwise pass through the reach to the South Fork Skykomish River.

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;

      As discussed in Section 4, the project area is infrequently used by skilled whitewater kayakers and rarely used by unskilled floaters (e.g., tubers). The area around the washout and Miller River Bridge is frequently used in summer months for picnicking and wading.

      The project design has considered safety with respect to these uses in the following ways:

      - Log structures will not be placed in the zone of most frequent public use around the Miller River Bridge and washout site. The exception to this is a single ELJ that is proposed near the west bridge abutment island to provide structure to that feature. This ELJ will be constructed in relatively high ground on a gravel bar such that it won't interact with low flow.

      - At least 1,000 ft of sight line will be provided to the first in-channel ELJs at the upstream extent of the project. Based on modeled flow velocity, this should provide kayakers more than 2 minutes to identify the placed wood and exit the channel along the left bank.

      - The project team has coordinated and will continue to coordinate with the whitewater kayaking community to update river guidance information to promote the preferred takeout upstream at the Miller River Group Camp, and to include a notice about the placed wood following construction. Signage will be considered at the upstream takeout location and upstream of the project reach to notify boaters about instream wood to indicate safe exit locations from the river.

   b. Wood location, positioning, and anchoring techniques;

      As described in Section 8.a, engineered log structures will be located where, in the as-built condition, they should be readily visible to kayakers coming from upstream. They will be backfilled with river alluvium and slash material so that they have very low porosity in the as-built condition. The structures will be spaced so they have 25-to-35-foot gaps between them, allowing them to be navigated if necessary.

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

Large woody debris was historically abundant in the Miller River. Placing stable large wood is essential to restoring more natural river processes and thus achieving the project's restoration goals. The proposed large wood structures will improve habitat locally and will alter hydraulics to increase access to more than 12 acres of floodplain habitat. As discussed above, the project team has carefully considered existing recreational uses and has designed wood structures to minimize public safety risks.

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

The project is being designed by multidisciplinary experts at HDR, Inc., Wolf Water Resources, and Watershed Sciences and Engineering. Designers (listed below) have extensive experience designing large wood in diverse settings and are using sophisticated tools like two-dimensional hydraulic modeling to inform design. Structural stability and scour calculations have been conducted following established engineering guidance, such as the U.S. Bureau of Reclamation's Large Woody Material Risk Based Design Guidelines, the Federal Highway Administration's (FHWA's) Hydraulic Engineering Circular (HEC) 23 (FHWA 2009), and the United States Army Corps of Engineers' (USACE's) Channel Restoration Design for Meandering Rivers (USACE 2001). Design development has been overseen by County staff with more than a decade of experience in hydraulic engineering and river restoration.

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?

Joey Smith, Professional Engineer (WA License #54959), HDR Senior Engineer has overseen the 30% large wood design and is the Engineer of Record.

Glen Leverich, Licensed Geologist (WA License # 3016), Wolf Water Resources Principal Geomorphologist, developed the 30% design supporting technical analyses.

Michael Garello, Professional Engineer (WA License #44052), HDR National Technical Lead for Fisheries Ecohydraulics Practice conducted a quality control review of the 30% plans and basis of design.

Chris Ewing, Professional Engineer (WA License #51412), King County Senior Engineer and Project Manager for the Miller River Floodplain Restoration Project, reviewed the 30% design documents.

Todd Hurley, Licensed Geologist (WA License # 1106), King County Senior Geologist, reviewed the 30% design documents.

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)?

Michael Thai, King County Senior Ecologist, reviewed the 30% design documents.

Chad Wiseman, HDR Fisheries Lead, led the preliminary design.

Digitally signed by Ewing, Chris
Date: 2026.07.01 12:22:53-07'00'

7/1/2026

Project Manager Date

McCarthy, Sarah

Digitally signed by McCarthy, Sarah
DN: E=Sarah.McCarthy@kingcounty.gov, CN="McCarthy, Sarah", OU=Users, OU=King Street, OU=WLRD, DC=dnrp, DC=kingcounty, DC=lcl
Date: 2026.07.01 16:21:18-07'00'

Supervising Engineer, Project Supervisor or Unit Manager Date

II. Pre-Construction Information (70% or 100% design with permits) *These questions relate to the designed and permitted project. Information should include input resulting from permit review process, SEPA, boater safety meetings and any other stakeholders.*

11. Have any answers provided in Section I at the Preliminary Design Phase changed in the interim? If so, provide the new answers and the rationale for the change.

12. What regulatory review or permits are required for the project (e.g. HPA, Clearing and Grading permit, COE permits)? List any conditions or requirements included in the permit approvals relevant to placement of large wood in the project.

13. What specific actions or project elements were employed to address public safety in the final, permit-approved design?

14. Describe how the project team solicited public input on the preliminary design. Describe the input received from the public and how, if appropriate, the project team has responded to this input.

15. Describe any additional design modifications or mitigating actions that were or will be taken in response to the public comments.

16. Will further educational or informational materials be made available to the public to heighten awareness of the project (e.g., public meeting, press release, informational website, or temporary or permanent signage posted in the vicinity of the project)? If so, explain.

17. If the project is expected to influence the recruitment, mobility or accumulation of natural wood, has a Public Safety Management Plan been completed?

_____

Project Manager Date

_____

Supervising Engineer, Project Supervisor or Unit Manager Date

III. Post-Construction Actions or Project Modifications

18. Have any answers provided in Sections I and II at the Preliminary design and Pre-Construction phases changed in the interim? If so, provide the new answers and the rationale for the change.

19. Briefly describe the scope and timing of post-construction monitoring and inspection activities planned for the project as they relate to large wood. If a Public Safety Management Plan or Monitoring Plan has been developed for the project, you may simply reference and attach that document.

20. If post construction monitoring or inspections result in modifications to the project, please describe the action taken and the rationale and consistency with the Public Safety Management Plan, if applicable.

Project Manager Date

Supervising Engineer, Project Supervisor or Unit Manager Date