

# 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 Russell Road Levee Setback

Project Manager: Erik Peters

River/River Mile/Bank: Green River / RM 17.85 – 19.25 / Right

Date 7-15-16

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 is located on one of the only sites in the Lower Green River without major development along the riverbank, providing a rare opportunity for cost effective levee setback and substantial habitat restoration. The King County Flood Control District has identified this project as an early action project of the Green River System Wide Improvement Framework (SWIF) for improving the level of flood protection for the Lower Green River valley to current engineering standards. The Muckleshoot Indian Tribe and WRIA 9 have identified the reach as a priority for habitat restoration for the recovery of ESA-listed salmonid species and to fulfil Treaty Fishing Rights. The project is identified as a priority project (Project LG-10) in the 2005 WRIA 9 Salmon Habitat Plan, and is ranked in the top tier of the Puget Sound Partnership Near-Term Action Agenda (#22 of 250 habitat projects; #2 of freshwater projects).

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 as follows:
  - Increase the flow containment capacity of the flood protection system
  - Construct a flood protection system that balances policy directives regarding flood protection (e.g., scour protection, stability, and vegetation maintenance), habitat restoration, and recreational use
  - Set the new flood protection system back from the river, where feasible, to improve riverine and riparian processes, functions, and habitat
  - Design a system that minimizes long-term maintenance needs and associated costs

Project objectives associated with the above goals are as follows:

- Flood Protection:
  - Convey the 0.2 percent annual exceedance probability (500-year) flood with 3 feet of freeboard
  - Set back the flood protection system (levees and/or floodwall), where feasible, to reduce scour potential, increase resiliency and reduce life cycle costs
- Riparian and Aquatic Habitat:
  - Provide suitable rearing habitat for juvenile salmon by creating shallow slow water edge habitats that provide suitable depths and velocities over a range of flows during the rearing period
  - Provide high flow refuge habitat for juvenile salmon

- Provide large woody debris to perform multiple functions, including cover, velocity refuge during high flows, and scour to create pools
- Provide habitats that function over a sustained period and manage adaptively
- Provide compatibility with future efforts to expand habitat
- Provide native riparian vegetation, including trees, to reduce solar heating, stabilize streambanks, create overhanging cover, and allow for future large woody debris recruitment
- Recreation and Access:
  - Maintain vehicular access to Van Doren's Landing Park, Kent Nursery, and Green River Natural Resource Area (GRNRA) via Lower Russell Road
  - Improve pedestrian/bicycle access and tie into existing trails at S. 228th Street and S. 212th Street bridges
  - Reduce vehicular traffic on Lower Russell Road that impacts GRNRA and recreational users
  - Relocate and enhance Van Doren's Landing Park

Funding sources include \$17.4 million from the King County Flood Control District, \$4.9 million from a Washington State Department of Ecology Floodplains by Design grant, and \$300,000 from a WRIA 9 Cooperative Watershed Management grant (pending).

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.

Salmon habitat in the Lower Green River is degraded compared with historical conditions as a result of land use changes, floodplain development, and river management activities such as channel confinement by levees and revetments, flood control at Howard Hansen Dam, and diversion of the White River so that it no longer flows into the Green River. The highly engineered Lower Green River that resulted from these actions is characterized by confined, armored channels that lack the in-stream geomorphic complexity and floodplain connection needed to create aquatic habitats that support healthy fish populations, including ESA-listed species such as Puget Sound chinook salmon, steelhead, and bull trout. The Lower Green River main stem channel is physically isolated from its floodplain by a series of levees and revetments, and hydrologically isolated from the floodplain by both river bed incision and greatly reduced flood elevations. Shoreline and riparian areas lack mature trees, resulting in minimal shade and elevated water temperatures. Existing water temperatures and dissolved oxygen do not meet water quality standards, leading to adverse, sometimes lethal, affects to threatened species; the river is on the Clean Water Act Section 303 (d) list and has a total maximum daily load (TMDL) for water temperature. The lack of riparian trees and shrubs also reduces available food resources for juvenile salmonids.

The river channel through the project reach is confined on both sides by levees and revetments. There is almost no naturally occurring large wood in the project reach; any wood that may be present at a given time quickly moves through the reach since there is no structural complexity to retain it. Seven species of salmonids use the river in the project reach: chinook, chum, pink, and coho salmon, and steelhead (rainbow), cutthroat, and bull trout. The project is located on one of the only sites in the Lower Green River without major development, providing a rare opportunity for substantial habitat restoration.

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?

Land adjacent to the project area is all City of Kent open space, park or regional trail. Van Doren's Landing Park, the Green River Natural Resources Area, and the Green River Trail are within the project area. The closest school is over 2 miles away. River recreational use of this reach of the river is low based on the County's Synthesis of 2013 River Recreation Studies (pg. 31). The full report may be found here <http://www.kingcounty.gov/depts/dnrp/wlr/sections-programs/river-floodplain-section/documents/2013-recreation-study.aspx> Compared to the other two sections of the Green River studied (upstream at Whitney Bridge RM 41.3, and Auburn-Black Diamond to Isaac Evans Park RM 29.1-33.4), the lower Green River through the project site had much lower numbers of people per day, the highest life vest usage, and the highest use of boats (canoes and kayaks) rather than rafts and inner tubes.

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.

Wood components of the project are conceptual at this time; preliminary wood locations are shown on the 30% design drawings. Wood will be placed in habitat restoration areas such as off channel/channel margin habitat created between the existing river channel and the setback levee (about 15 acres in all), and in some locations at the channel edge along the 1.4 mile project reach. The 30% design identifies 104 pieces of wood to be installed in habitat areas of the project. The river will interact with wood at flows above 500 cfs (above typical summer flow rate). The river channel may migrate in the future and occupy constructed off-channel habitat and the wood placed there. Design of the wood will account for future channel migration potential.

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 purpose of the placed wood is to create and enhance rearing and refuge habitat for juvenile salmon, provide immediate shade and thermal refuge for fish, and create holding pools for adult salmon migrating upstream. Placed wood may also function to control hydraulic relationships between the river and constructed off channel/channel margin aquatic habitats. The project is not currently designed to intentionally trap additional wood floating in the river but it may do so. Section 2.8 of the 30% Design Report (see project website for link to document) contains additional information on the project objectives the wood is intended to achieve.

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.

There is very little natural large wood in this reach of the Green River and very few trees along the right bank of the river within the project reach so the project is not anticipated to have much effect on wood recruitment or mobility. The off-channel aquatic habitat area is anticipated to temporarily collect wood. Eventually (20+ years out) some trees that grow up and die within the off-channel area will be recruited. Elsewhere, trees planted in the riparian corridor (150 foot buffer along channel bank) to restore riparian functions are expected to contribute to natural recruitment, in the long-term (20+ years after project construction). The existing rock revetment that will remain will limit bank erosion and wood recruitment rates.

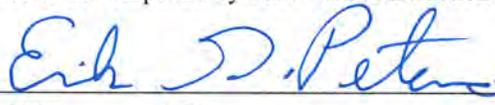
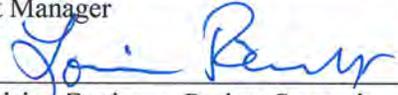
8. Describe how public safety considerations have been incorporated into the preliminary project design. For placed wood, address each of the considerations:
  - a. Type, frequency, and seasonality of recreational use; As stated above, use of this reach of the river is low based on the County's Synthesis of 2013 River Recreation Studies Compared to the other two sections of the Green River studied (upstream at Whitney Bridge RM 41.3, and Auburn-Black Diamond to Isaac Evans Park RM 29.1-33.4), the lower Green River through the project site had much lower numbers of people per day, the highest life vest usage, and the highest use of boats rather than rafts and inner tubes.
  - b. Wood location, positioning, and anchoring techniques; see 30% design drawings for wood location. Individual logs (44 total), anchored with large boulders, are placed along the river channel. Clusters of large wood (50 total), anchored with large boulders, are intended within the off-channel habitat area. One engineered log jam (ELJ) anchored with piles and rock ballast is intended within the off-channel habitat area.
  - c. Maximizing achievement of project goals and objectives while minimizing potential public safety risks; The inclusion of large wood provides multiple functions including cover and high flow refuge for juvenile salmon, promotion of local scour to create pools. Public safety risks have been minimized by not placing wood structures within the main channel, accounting for future channel migration potential is the placement of wood structures in the off-channel habitat areas. Risks will be further minimized during design to avoid wood structures that could strain people at recreational flow rates and be difficult for recreational users to escape.
  - d. Use of established and recognized engineering, geological, and ecological expertise. The project team includes an experienced County Engineer, an experienced County Ecologist, and an engineering consultant team with added river and habitat engineering, ecological, and geotechnical design experience. The multidiscipline team is involved in the design and review of the project. The design of this project is consistent with best professional practices and standard of care.

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 the project has been reviewed and approved by multiple licensed civil engineers (PEs), within their area of practice. Licensed geologists are also involved with the project. There will be multiple Engineer of Record signing respective sheets of the design drawings based on their area of practice and project role. At 30% design the expected signing PEs include: Erik Peters, Vaughn Collins, Lee Frederiksen, Wes Jacobs and Brian Ward. A series of reviews and approvals will occur until 100% design is complete when drawings will be signed before construction bidding.

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 the County's project ecologist Kerry Bauman has reviewed and approved of the 30% design. Final design is anticipated to be completed by 2018 with construction in 2019 after public process and permitting is completed.

	<p>7-15-16</p>
Project Manager	Date
	<p>7-15-16</p>
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?

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Project Manager

Date

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Supervising Engineer, Project Supervisor or Unit Manager

Date

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**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.

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Project Manager

Date

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Supervising Engineer, Project Supervisor or Unit Manager

Date