



King County

ENVIRONMENTAL CHECKLIST

COUNTYLINE LEVEE SETBACK

Purpose of the Checklist:

The State Environmental Policy Act (SEPA), Chapter 43.21 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 agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. 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 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 governmental agencies 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. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be a significant adverse impact.

Use of Checklist for Nonproject Proposals:

Complete this checklist for nonproject proposals, even though questions may be answered “**does not apply**.” In addition, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (PART D).

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.

A. BACKGROUND

1. *Name of the proposed project, if applicable:*

Countyline Levee Setback

2. *Name of Applicant:*

Sarah McCarthy
King County Department of Natural Resources and Parks
Water and Land Resources Division

3. *Address and phone number of applicant and contact person:*

King County Water and Land Resources Division
201 South Jackson Street, Suite 600
Seattle, WA 98104-3855
Phone: 206-263-0492
Fax: 206-205-5134

4. *Date checklist prepared:*

10/9/2012

5. *Agency requesting checklist:*

King County Department of Natural Resources and Parks
Water and Land Resources Division

6. *Proposed timing or schedule (include phasing, if applicable):*

May 1, 2014 – November 30, 2015

This work window includes phased construction. Proposed phasing includes construction of the setback levee and engineered log structures in 2014 and removal of the existing levee and revetment in 2015.

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

No.

8. *List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.*

Czuba, J.A., Czuba, C.R., Magirl, C.S., and F.D. Voss. 2010. Channel-conveyance capacity, channel change, and sediment transport in the lower Puyallup, White, and Carbon Rivers, western Washington: U.S. Geological Survey Scientific Investigations Report 2010-5240, 104p.

- Herrera. 2010. Summary of sediment trends: Lower White River: RM 4.44 to RM 10.60. Prepared for King County Department of Natural Resources and Parks, Water and Land Resources Division, River and Floodplain Management Section, Seattle, Washington.
- Herrera. 2012a. Hydraulic Modeling Approach and Initial Modeling Results Technical Memorandum, White River at Countyline Levee Setback Project. Prepared for King County Department of Natural Resources and Parks, Water and Land Resources Division, River and Floodplain Management Section, Seattle, Washington.
- Herrera. 2012b. Floodplain Geomorphic Surface Development Approach Technical Memorandum, White River at Countyline Levee Setback Project. Prepared for King County Department of Natural Resources and Parks, Water and Land Resources Division, River and Floodplain Management Section, Seattle, Washington.
- Herrera. 2012c. Draft Geomorphic Assessment, White River at Countyline Levee Setback Project. Prepared for King County Department of Natural Resources and Parks, Water and Land Resources Division, River and Floodplain Management Section, Seattle, Washington.
- Latterell, J. J. 2011. Wood budget for Countyline to A Street Levee Modification Project, White River, WA. King County Department of Natural Resources and Parks, Water and Land Resources Division, Seattle, WA.
<http://your.kingcounty.gov/dnrp/library/2011/kcr2270.pdf>.
- King County. 2011. Large Wood Safety Checklist. King County Department of Natural Resources and Parks, Water and Land Resources Division, Seattle, WA.
- King County. 2012a. County Line to A Street Geotechnical Investigation. King County Department of Transportation, Road Services Division, Renton, WA.
- King County. 2012b. Wetland Delineation Report and Habitat Assessment for the Countyline Levee Setback Project, White River, WA. King County Department of Natural Resources and Parks, Water and Land Resources Division, Seattle, WA.
- King County. 2012c. Draft Countyline Reach Monitoring Plan, White River, WA. King County Department of Natural Resources and Parks, Water and Land Resources Division, Seattle, WA.
- King County. 2012d. Draft Summary of Lower White River In-Channel Sediment Monitoring Data through 2011, Technical Memorandum. King County Department of Natural Resources and Parks, Water and Land Resources Division, Seattle, WA.
- King County. 2012e. Draft Evaluation of Gravel Removal on the Lower White River, Technical Memorandum. King County Department of Natural Resources and Parks, Water and Land Resources Division, Seattle, WA.

King County. 2012f. Countyline Levee Setback Project, 30% Design Alternatives Analysis. King County Department of Natural Resources and Parks, Water and Land Resources Division, River and Floodplain Management Section, Seattle, Washington.

Paragon Research Associates. 2008. A Street-County Line Levee Modifications Project Cultural Resources Literature Review, King and Pierce Counties, Washington. Prepared for King County Department of Natural Resources and Parks, Water and Land Resources Division, River and Floodplain Management Section, Seattle, WA.

Paragon Research Associates. 2011. A Street-County Line Levee Modification Project Cultural Resources Assessment, King and Pierce Counties, Washington. Prepared for King County Department of Natural Resources and Parks, Water and Land Resources Division, River and Floodplain Management Section, Seattle, WA.

9. *Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.*

No.

10. *List any government approvals or permits that will be needed for your proposal, if known.*

Permit	Issuing/Regulating Agency
Clean Water Act Section 404 Permit	US Army Corps of Engineers (USACE)
Rivers and Harbors Act Section 10 Permit	USACE
Endangered Species Act Section 7 Consultation	National Marine Fisheries Service and US Fish and Wildlife Service
CLOMR/ LOMR	Federal Emergency Management Agency
Clean Water Act Section 401 Water Quality Certification	WA Dept of Ecology
Coastal Zone Management Consistency Determination	WA Dept of Ecology
NPDES Permit	WA Dept of Ecology
Temporary Water Right Permit	WA Dept of Ecology
National Historic Preservation Act Section 106	USACE/Tribes/WA Dept of Archaeology & Historic Preservation
SEPA (State Environmental Policy Act)	King County (lead agency)
Hydraulic Project Approval	WA Dept of Fish & Wildlife with Tribal review
Aquatic Use Authorization	WA Dept of Natural Resources
Shoreline Management Act Compliance	City of Sumner, City of Pacific, Pierce County
Critical Areas compliance (RHWA)	City of Sumner, City of Pacific, Pierce County
Floodplain Development Permit	City of Sumner, City of Pacific, Pierce County
Clearing/Grading Permit	City of Sumner, City of Pacific, Pierce County
Flood Hazard Certification	City of Sumner, City of Pacific, Pierce County
Right of Way Construction Permits	City of Sumner, City of Pacific, Pierce County
Demolition Permit	City of Pacific
Asbestos/Demolition Notification	Puget Sound Clean Air Agency

In addition, King County will coordinate with the affected tribes to maintain tribal treaty fishing access during construction.

11. *Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on the project description.)*

Project Description

The Countyline Levee Setback Project is designed to reduce flood risk, restore natural river processes, reconnect the river to its adjacent floodplain, and improve fish habitat along 1.3 miles of the Lower White River (between River Mile 5.0 and 6.3). This will be accomplished by removing an existing levee and revetment constructed in the 1910s along the left bank (looking downstream) between the A Street SE/BNSF Railway (City of Auburn) Bridges and 8th Street E (City of Sumner) Bridge and constructing a new setback levee east of the wetland. The presence of top-of-bank levees and revetments in this Countyline River Reach have constricted the channel for nearly one hundred years, thereby dramatically altering the physical and biological character of the river, degrading fish habitat, and reducing salmon productivity in this reach. Relocation of the levee will reconnect approximately 100 acres of wetland and floodplain, allowing new and complex habitats to form and existing habitats to have a more direct connection to the river.

The project is located within the City of Pacific, City of Sumner, and unincorporated Pierce County. The project includes:

- removal of approximately 4,000 LF (45,000 cubic yards) of existing levee and revetment along the left bank of the Lower White River,
- construction of a setback levee and biorevetment,
- placement of large wood structures to deflect and diffuse erosive flows and encourage the formation of desired habitat features, and
- wetland buffer planting (approximately 11 acres of currently unvegetated upland).

Background Information

The lower White River is a highly modified system. The White River originates from the Emmons Glacier on Mount Rainier and flows through a relatively higher gradient channel with steeper valley walls before reaching a lower gradient reach where the proposed Countyline Levee Setback Project is located. The White River historically flowed into the Green River in the City of Auburn. In 1915, the Auburn Wall was built to permanently divert the White River into the Stuck River channel, a substantially smaller tributary channel that flowed to the Puyallup River. The new channel was extensively dredged to accommodate White River flows.

The White River carries a high sediment load due to its origins on an active, glaciated volcano, a steep channel gradient through most of its length, and its erosion through relatively new glacial and volcanic deposits. With a marked decrease in channel gradient and channel confinement downstream of the White River canyon near the City of Auburn, the river naturally deposited sediment to form a broad alluvial fan. Channelization and construction of a confining levee system in the early 1900s in this naturally depositional environment of a broad alluvial fan likely enhanced the vertical rates of sediment

accumulation within the channel, the historical response to which was a consistent river management program of gravel extraction to maintain river channel capacity in this Countyline Reach (Herrera 2010). Cessation of gravel removal in the late 1980s probably has in part contributed to channel aggradation within the confines of the levees in the lower reaches of the White River.

Flood Risk Reduction Need

The problems associated with channel aggradation in this reach became increasingly evident during the January 2009 flood event. During this flood, the U.S. Army Corps of Engineers released up to 11,700 cubic feet per second (cfs) from Mud Mountain Dam, as had been done in past flood events. However, flood damage in 2009 along the Countyline Reach of the Lower White River was significantly different than damage during earlier events.

Floodwaters overtopped the right bank (looking downstream) by Pacific City Park and flowed southward through the White River Estates neighborhood, continuing into Pierce County along the floodplain areas of Butte Avenue. Over 100 homes in White River Estates neighborhood, several commercial businesses along Butte Avenue, and the Megan's Court Apartments near the city park experienced flooding of first floor living spaces, office areas, and building crawl spaces. Evacuations of residents occurred along Butte Avenue, south of White River Estates, and many efforts were made by citizens and City of Pacific staff to place sandbags in an attempt to protect residential structures. On the opposite riverbank, floodwaters overtopped into agricultural lands in the City of Sumner and overtopped 8th Street E, also known as Stewart Road SE; a major arterial.

Subsequent investigations have revealed that the channel capacity in the Countyline Reach of the White River has decreased from 25,000 cubic feet per second (cfs) to 8,000 cfs. With no action in this area, the channel is projected to completely fill with sediment in approximately 15 years. This significantly increases the flood risk for commercial, industrial, and residential parcels adjacent to and downstream of the project area. Analyses also indicate that gravel removal would have a relatively minor and short-lived effect on reducing flood water levels in this Countyline Reach, especially compared to those with a setback levee in place (Czuba et al. 2010; King County 2012e). In addition, the 8th Street E Bridge in Sumner which has two in-channel piers and little remaining clearance from its low chord, significantly constricts flows and will be at increased risk of overtopping or failing during high flow events.

Biological Need

The levees and their ripped banks have changed the way the White River moves and deposits sediment, shortened the river's length, reduced access to side channels and floodplain wetlands, reduced the quality of riparian habitat for fish and aquatic species as well as other riparian wildlife, and reduced the supply of large wood to the active river channel. The lower White River today is relatively simple, consisting primarily of fast-water habitats (referred to as riffles or runs) with very few pools or off-channel habitats. These conditions provide very little cover for juvenile salmon, making the lower river less productive for many species at critical life stages.

The need for rearing and off channel salmonid habitat in this reach of the White River is documented in the Puyallup Watershed (WRIA 10) and Chambers/Clover Creek Watershed

(WRIA 12) Salmon Habitat Protection and Restoration Strategy (Pierce County 2008). This report notes:

“The loss of floodplain habitat that is limiting the performance of Puyallup and White River Chinook is due to the channelization and confinement of the river within an extensive system of revetments and levees (flood works) in the mainstems of the Puyallup, White, and Lower Carbon Rivers. Preferred projects in the mainstem areas would protect and restore floodplain habitat such as side channels and backwaters.” (Page 17)

The Strategy identifies lack of this type of habitat as a bottleneck in meeting basin-wide recovery goals for Chinook salmon and concludes:

“Levee setbacks and estuarine habitat creation are the most beneficial types of actions needed for recovery of Chinook in WRIA 10.” (Page 21)

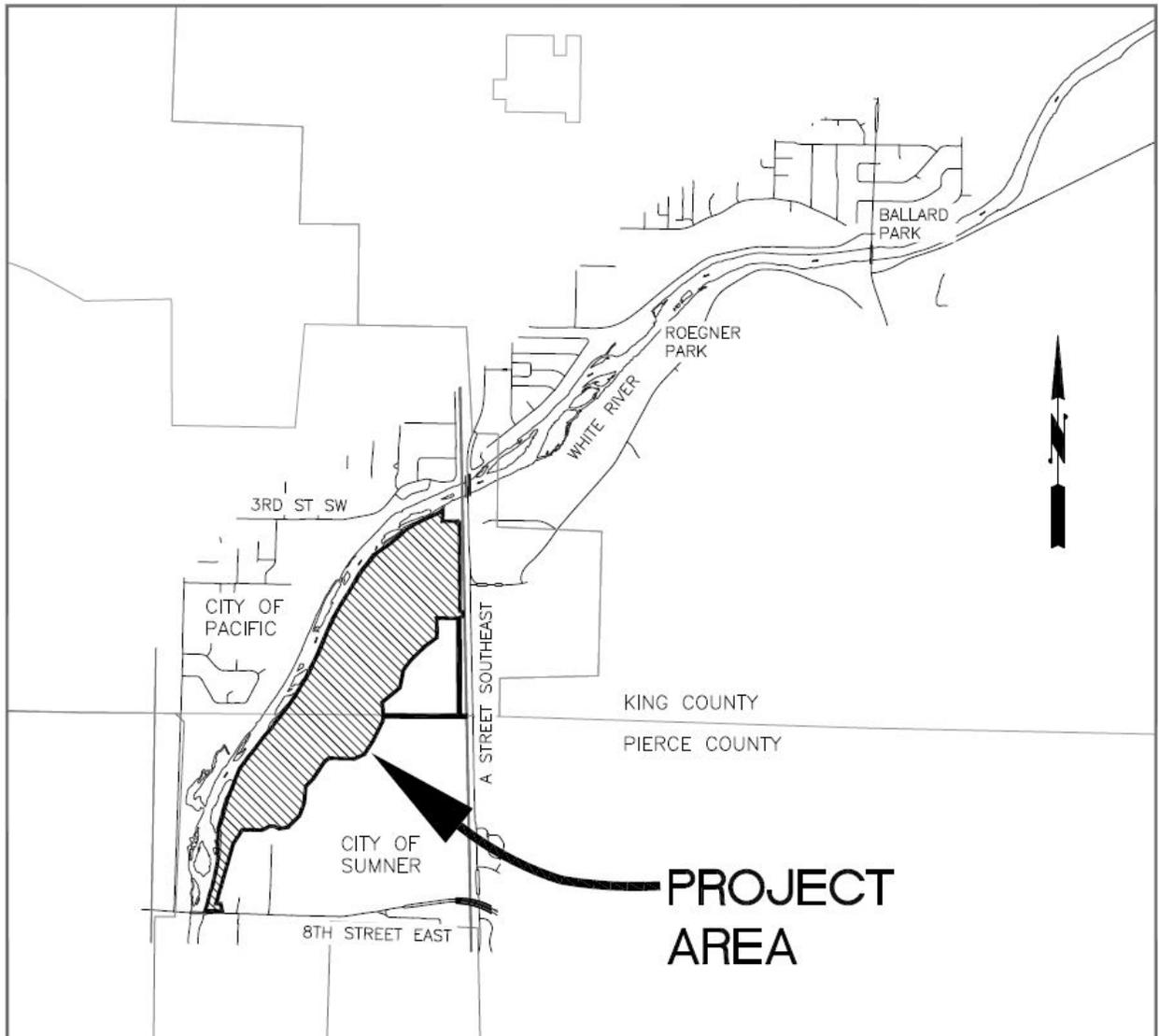
WRIA 10/12 conducted a levee setback feasibility study in 2008, and the Countyline Levee Setback Project was a highly ranked project for its potential to provide high quality juvenile salmon rearing habitat. The project was also added to the WRIA 10/12 3-Year Implementation List and ranked as having a high benefit to salmon.

12. *Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity plan, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.*

The project is located between River Mile (RM) 5.0 (8th Street E Bridge) and 6.3 (A Street SE/BNSF Railway Bridges), on the left bank of the White River. The project area is located within the Cities of Pacific (King County) and Sumner (Pierce County), as well as unincorporated Pierce County.

The project is located in Section 36, Township 21 North, Range 4 East of the Willamette Meridian; and Section 1, Township 20 North, Range 4 East of the Willamette Meridian.

North End of Project Site: Latitude: 47.26545, Longitude: -122.2305
South End of Project Site: Latitude: 47.24918, Longitude: -122.24198



B. ENVIRONMENTAL ELEMENTS

1. Earth

- a. *General description of the site (underline one): flat, rolling, hilly, steep slopes (existing levee slopes), mountainous, other.*
- b. *What is the steepest slope on the site (approximate percent slope)?*

The steepest slopes on the site include the existing levee slope, which has a maximum slope of approximately 100%, and the wetland edge adjacent to the agricultural properties, which has a maximum slope of approximately 75%. The rest of the site is generally flat.

- c. *What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.*

There are five soil types mapped by the NRCS in the project area: mixed alluvial land, Shalcar muck, Puyallup fine sandy loam, Pilchuck fine sand, and aquic xerofluvents.

- d. *Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.*

The left bank through the project area has been stabilized for approximately 100 years with coarse gravel and riprap. There is a small segment of levee face and toe rock loss near the county line.

- e. *Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate the source of fill.*

Levee removal will require approximately 45,000 cubic yards (CY) of excavation over approximately 4,000 linear feet (LF). All levee prism excavation will occur above and landward of the Ordinary High Water Mark (OHWM) of the White River; removal of levee face and toe rock will involve some work below and waterward of the OHWM. Limited levee excavation may occur in Year 1 (2014) to allow for material reuse onsite. Any material that cannot be reused onsite will be exported to an approved disposal facility (e.g., a King County soil recycling facility).

Levee setback construction will require approximately 75,000 CY of earthen fill over approximately 6,000 LF. Approximately 2,000 CY of rock will be used to stabilize the new levee near the downstream end where the levee is being partially constructed in the wetland.

Biorevetment construction will include approximately 600 timber piles and 1,500 key logs over a length of approximately 5,000 LF. The biorevetment will include four bank deflector engineered log jams (ELJs) embedded into the biorevetment at the downstream edge of the large wetland (Wetland B; see Section B.3.a.1). With the exception of the deflector ELJs, most of the biorevetment will be constructed in the dry. Approximately 4,000 CY of backfill material (obtained from the foundation excavation of the ELJs and amended with large rock) will be placed behind the bank deflectors ELJs to anchor the logs.

Five apex ELJs will be constructed in Wetland B. Two large ELJs will be paired with two of the deflector ELJs at the downstream end. Three additional habitat structures will be constructed at the upstream inlet. These five ELJs will include approximately 230 key logs, 2,000 racking logs, 100 timber piles, and 5,000 CY of backfill (native material amended with large rock

The total footprint of the five apex ELJs will be approximately 0.7 acres (Ac). In addition, approximately 2.1 Ac will be cleared and graded for temporary ELJ construction access.

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

Yes, erosion could occur as a result of clearing, excavation, hauling of material and general project construction. There is potential for short term turbidity impacts on the White River adjacent to and downstream of the project area during the removal of riprap from the existing levee. There are likely to be turbidity impacts on the wetland during construction of the ELJs. The implementation of temporary erosion and sediment control measures and stabilization techniques (see B.1.h.) will minimize any potential adverse effects.

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

There will be no impervious surface created by this project.

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

During construction temporary erosion and sediment control measures such as silt fencing, straw bales, construction entrances, and street sweeping will be used to control and minimize erosion and sedimentation. Following construction, disturbed soil areas will be stabilized by using seed, mulch, erosion control blankets and installation of native vegetation. The setback levee will be inspected during and following each flood for signs of erosion, and appropriate measures such as application of geotextile fabrics and packing of any observed rills or gullies will be carried out promptly to address any observed erosion problems.

2. Air

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

The project has the potential to generate construction related dust. Dust control will be performed on an as-needed basis by stabilizing construction access surfaces and watering. All loads of soil or other debris leaving the site will be covered.

The completed project will not emit gasses with the potential to negatively affect climate change.

Construction equipment, including excavators, dump trucks, bulldozers, soil compactors impact drills and pick-up trucks, will be used during construction. This equipment will emit gasses including carbon dioxide (CO₂), methane and nitrous oxide, as well as others in much smaller amounts. The global warming potential (GWP) of these compounds is measured in "carbon dioxide equivalents," or CO₂e, which converts the GWP of various gasses into their equivalent in CO₂. The amount of CO₂e that may be emitted as a result of constructing the proposed project has been estimated by computing the amount of fuel to be consumed by equipment used to construct the project or by estimating their hourly output of various greenhouse gases. Fuel consumed or hourly output is then converted into

CO₂e emitted using formulae developed by the Energy Information Administration (EIA) of the U.S. Department of Energy.

Construction of the proposed project will likely result in the discharge of approximately 1,244 metric tons of CO₂e to the atmosphere.

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

Climate change is expected to result in a 10% increase in peak winter flows within the next 20 years. Since flows at the project site are controlled by Mud Mountain Dam, it is unknown how climate change will affect the project; however, project design has accounted for this 10% increase in sediment delivery in the long-term.

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

Approximately 4,000 trees will be planted on the site following construction. These trees should sequester more than 1,283 metric tons of carbon within 36 years of their planting at the site.

Engines will not idle unnecessarily and will be kept in proper working order with all filters and other emission control devices functional.

3. Water

- a. *Surface:*

- 1) *Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe the type and provide names. If appropriate, state what stream or river it flows into.*

Yes, the existing levee is located on the left bank of the lower White River. In addition, there are four wetlands within the project area (Wetlands A, B, C, and D). Wetland A is a riverine flow-through wetland extending along the upstream portion of the riverbank; it is approximately 0.16 acres in size. Wetland B is a depressional outflow wetland located within the majority of the low ground between the existing levee and the agricultural lands. It is approximately 77 acres in size. Wetlands C and D are small depressional wetlands located at the far north end of the forested area between the existing levee, the railroad, and the residential property; these wetlands are 0.22 and 0.02 acres, respectively. There is also a small Type Np stream (Stream A) which flows for approximately 594 LF between Wetland C and Wetland B.

- 2) *Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.*

Construction of the setback levee and revetment system will necessitate some encroachment into Wetland B and buffer reduction in the City of Sumner. Construction of engineered log jams will require temporary access roads into the

wetland as well as tree removal. Tree removal will result in a short-term loss of shade and cover in some areas. In addition, future flow through the forested wetland is likely to cause toppling of trees. These impacts will be mitigated by levee removal, installation of engineered log structures, and extensive buffer and floodplain revegetation. King County has documented that there are currently no salmonids in the depressional wetlands (Wetlands B, C, and D). In-river work will be limited to rock riprap removal.

- 3) *Estimate the amount of fill and dredge material that could be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.*

Direct wetland impacts in Wetland B include approximately:

- 750 cubic yards (CY) or 5,000 square feet (SF) of excavation to permanently remove artificial fill placed in the wetland at the south end of the project site.
- 12,000 CY (97,000 SF footprint) of temporary wetland excavation for ELJ and biorevetment placement
- 28,000 CY (81,000 SF footprint) of fill, including 23,000 CY (65,000 SF) of native alluvium and imported rock fill for ELJ and biorevetment placement; 4,000 CY (11,000 SF footprint) of native alluvium fill for the setback levee at the south end of the project site; and 1,000 CY (5,000 SF) of native alluvium for the north perimeter access road.

These quantities will be adjusted during subsequent design phases.

- 4) *Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities, if known.*

Yes. Surface water in the ELJ excavations will be pumped (with approved fish screening in place) to settling tanks and discharged back to receiving surface waters or used during construction for dust control and to moisture condition soils for compaction. Additional surface water could be pumped from the river or wetland for these purposes.

- 5) *Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.*

Yes, part of the project lies within the 100-year floodplain. The local jurisdictions involved regulate to different versions of the flood maps. The City of Pacific regulates to the 2009 King County Flood Study, and the City of Sumner regulates to the 1987 FEMA Maps.

The installed project will modify flood elevations along the entire reach of the White River from the A Street SE/ BNSF Railway Bridges to below the 8th Street E Bridge. Computer modeling to date has generated initial estimates of post-project flood elevations which indicate significant reductions in flood levels along the northerly extents of the project area and some minor increases affecting existing flood hazard areas in the southerly portion and downstream of the project area. Post-project estimates of Base Flood Elevations will be developed

and submitted to the FEMA, Washington Department of Ecology and the affected communities (Pierce and King Counties and the Cities of Pacific and Sumner) as part of the Conditional Letter of Map Revision (CLOMR) to initiate a formal change to federally-published flood mapping and studies.

- 6) *Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.*

No.

b. *Ground:*

- 1) *Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities, if known.*

No.

- 2) *Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage; industrial containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.*

N/A

c. *Water Runoff (including storm water):*

- 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.*

The primary sources of runoff within the existing project site are surface water runoff from Wetland B to the White River and stormwater ponding and runoff from the agricultural, residential, and light industrial land uses adjacent to the wetland. There is also a culvert running under the railroad that drains to the forested wetland complex at the north end. Once completed, the proposed activity will include a setback levee that will limit surface and stormwater runoff from the adjacent land uses (agricultural and industrial) to the wetland and ultimately the White River.

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

Waste materials will be prevented from entering the ground or surface waters by maintaining a clean site, properly disposing of debris and use of Best Management Practices to filter and trap material within the project site.

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

Temporary erosion and sediment control measures will be used during construction to reduce and control surface water runoff. Dense revegetation with native riparian plants with the project will be used to protect surface water quality following construction. No groundwater impacts are expected during or following construction.

4. Plants

- a. *Check or underline types of vegetation found on the site:*

- Deciduous trees: alder, maple, cottonwood, cherry, oak, other
 Evergreen trees: fir, cedar
 Shrubs (including willow species)
 Grass
 Pasture
 Crop or grain
 Wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
 Water plants: water lily, eelgrass, milfoil, other
 Other types of vegetation: blackberry, reed canary grass

The project site is heavily vegetated along the existing levee and within the forested portions of the wetland. The Countyline Levee has prevented channel migration for the past 100 years; therefore, trees have matured on the banks of the levee and have persisted in much of the wetland. Persistent and increased frequency of ponding in the deeper areas of the wetland has either prevented establishment of dense forest stands or has caused tree mortality. As a result, there are several (primarily cottonwood) snags at the downstream end of the wetland.

- b. *What kind and amount of vegetation will be removed or altered?*

It is estimated that up to 1000 trees could be removed for construction, primarily from the existing levee slopes and proposed engineered log jam construction and access areas within Wetland B. Large trees will be avoided where possible, and small areas of levee face can be left intact in densely vegetated areas. Avoidance techniques include notching around large trees during levee riprap removal and excavation, adjusting temporary construction access roads to engineered log structures, and staggering the biorevetment segments to avoid significant trees. Depending upon the location on the levee or within the wetland, affected vegetation consists primarily of 30-93% red alder, 5-48% black cottonwood, 1-12% big leaf maple, up to 10% bitter cherry, and up to 2.5% Douglas fir. Non-native blackberry also will be removed from the wetland boundary, buffer, and existing levee.

A detailed tree survey will be conducted for the 60% design, following refinement of construction areas. Subsequent to this work, King County will identify which trees or densely vegetated areas should be avoided during construction. Detailed tree removal information will be included with federal, state, and local permit applications.

This project is designed to allow for regular flow through portions of the currently forested wetland area. This change in hydrology is expected to cause an initial pulse of up to 15 acres of forest erosion with up to 1,144 pieces of large wood (primarily red alder and cottonwood) entering the river system depending upon the occurrence and frequency of future flood flows. Additional forest erosion and tree recruitment may occur in subsequent years. This information is included in the Countyline Wood Budget report (Latterell 2011). For the wood budget analysis, full channel avulsion into the wetland area was assumed in order to understand the most extreme scenario in terms of wood loading within and downstream of the project site. However, the expected geomorphic evolution of the project area is a partial channel avulsion into the wetland area, leaving a band of woody riparian vegetation between the existing channel and the future predicted channel complex (Herrera 2012c). An expected fully evolved project area condition is depicted in the Draft Geomorphic Assessment (Herrera 2012c, Figure 7).

Construction-related removal of trees, in addition to post-project erosion of forest stands, are expected to reduce shade and cover along the river and within the wetland. These impacts will be partially mitigated through revegetation of an 11-acre riparian buffer and 0.9 acres of depositional bars associated with the ELJs. These actions will eventually provide shade and cover along the project margin and in localized portions (ELJ locations) of the project area. Short-term impacts will not be directly mitigated through revegetation. Temperature impacts may be lessened by increased channel complexity, pool scour, and interstitial flow.

- c. *List threatened or endangered species known to be on or near the site.*

No threatened or endangered plant species have been seen on or near the project site.

- d. *Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:*

Significant trees will be avoided during construction when feasible. The biorevetment alignment will be designed to avoid large cottonwoods along the wetland edge. Temporary construction access to ELJ sites can be adjusted where practical to avoid large trees.

The wetland buffer (between the setback levee and the biorevetment), the depositional bars behind the ELJs, and the outlet channel margins will be planted with native trees, shrubs, and grasses following construction. The planting plan will be updated with the 60% design.

5. Animals

- a. *Check or underline any birds or animals that have been observed on or near the site, or are known to be on or near the site:*

- Birds: hawk, heron, eagle, songbirds, other: kingfisher, merganser, dipper
 Mammals: deer, bear, elk, beaver, other: otter, vole, mouse
 Fish: bass, salmon, trout, herring, shellfish, other: whitefish, sculpin, dace

Amphibians (Northwestern salamander egg masses, Long-toed salamander egg masses, Pacific tree frog adult, Northern red-legged frog adult, bullfrog adult) have also been documented in the depressional wetlands within the project site.

- b. *List any threatened or endangered species known to be on or near the site.*

Puget Sound Chinook salmon
Coastal/Puget Sound steelhead trout
Coastal/Puget Sound bull trout

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

Juvenile and adult anadromous and resident fish migrate through the project area (mainstem White River only) during certain times of the year. Most of the large river valleys in King County – including the White River – comprise a portion of the Pacific Flyway used by waterfowl and other migratory bird species.

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

This project has been designed to avoid and minimize direct construction impacts on fish in the White River. Most ground-disturbing actions will occur landward and above the Ordinary High Water Mark (OHWM) of the river channel. The only construction-related action proposed to occur below the OHWM of the White River is removal of existing levee face and toe rock, which is essential for the restoration of riverine process and function within the project area. In accordance with permit conditions, in-water work will be timed to impact the fewest fish species and life stages possible.

The engineered log jams proposed for construction in Wetland B will create hydraulic complexity and roughness, as well as high flow refuge and escape cover for juvenile and adult fish. The depositional bars associated with the apex jams will be planted with native vegetation, which will provide shade, leaf litter, and wildlife habitat.

Parts of the existing levee and wetland edge have significant invasive blackberry growth, which outcompetes native vegetation and provides minimal habitat for fish, birds, and small mammals. The proposed project will remove blackberries and other invasive plant species, and revegetate all disturbed areas with native trees, shrubs and grasses. In addition, an approximately 11-acre riparian buffer (which is currently agricultural fields, residential land, and open gravel or paved areas) will be restored with native trees and shrubs. This buffer will provide fish habitat and water quality benefits to the wetland and future river channel, as well as bird and wildlife habitat.

The project is expected to have mostly negative impacts on lentic-breeding amphibian habitat. By reverting the area to an actively flowing system, the standing water habitat preferred by certain amphibian species for breeding will be less available. However, some standing water wetland areas may form or be retained in portions of the project area, particularly at the upstream end above the expected path of river entry.

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.*

Petroleum fuels will be used to operate all construction and watering equipment during construction. Once the project is completed, petroleum fuels will be used to power watering trucks or portable pumps (to irrigate installed vegetation), if their temporary use is permitted by the Department of Ecology, during hot weather in the summer for up to three years following construction. Once the project is completed and the vegetation is established, no further source of energy will be needed.

- 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:*

Energy conservation features are not included in this proposal.

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.*

The potential for spills of toxic or hazardous materials, and related risks of fire or explosion are limited to the petroleum fuels used for project construction, maintenance and irrigation. A spill prevention plan will be implemented to minimize the risk of spills, response kits will be maintained on site at all times during construction, and excess fuel will not be kept on site.

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

The need for special emergency services is not anticipated. 911 will be called in the event of an emergency.

- 2) *Proposed measures to reduce or control environmental health hazards, if any:*

Best management practices such as fuel containment and a spill response plan will be used during construction to reduce and control environmental health hazards.

b. Noise:

- 1) *What types of noise exist in the area that may affect your project (for example, traffic, equipment, operation, other)?*

Urban traffic, rail traffic from the nearby railroad tracks, light industrial noise from adjacent properties (including a masonry business) and park/residential maintenance (e.g., lawn mowing) are the main sources of existing noise in the project area. None of these noises will affect the project.

- 2) *What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (for example, traffic construction, equipment operation, other)? Indicate what hours noise would come from the site.*

On a short-term basis, noise will be generated from construction equipment (e.g., truck traffic hauling materials to and from the site, excavator activity, pile driving, etc.). Short-term noise impacts will be minimized by limiting the hours of construction in accordance with applicable regulations. Short-term noise impacts will cease upon project completion; no long-term noise impacts would be created by or associated with the proposed project.

- 3) *Proposed measures to reduce or control noise impacts, if any:*

Standard mufflers will be used on all construction equipment during regular daytime working hours.

8. Land and Shoreline Use

- a. *What is the current use of the site and adjacent properties?*

The current land use of the site and adjacent properties includes wetlands, one residential property, agricultural fields, and light industrial operations. Over half of the currently agricultural land is slated for warehouse development (SEPA process complete; grading permits approved by the City of Sumner). The properties on the opposite bank include a public park, publicly-owned land (City of Pacific, King and Pierce Counties), and residential properties.

- b. *Has the site been used for agriculture? If so, describe.*

The adjacent fields are either currently being farmed (mainly rhubarb north of the county boundary line and winter squash on a portion south of the county boundary line) or sitting fallow in preparation for development (City of Sumner, south of the county boundary line).

- c. *Describe any structures on the site.*

Structures on the site include a levee access road (also used as an informal foot trail), a Pierce County gate, and one residential property with a primary house, two rental units, and outbuildings. An adjacent property on the south end of the project site has buildings used for light industrial purposes.

- d. *Will any structures be demolished? If so, what?*

The gravel levee access road/foot trail will be removed and reconstructed on the crest of the proposed setback levee. The residential properties and outbuildings will be demolished or relocated.

- e. *What is the current zoning classification of the site?*

Pacific: Open Space

Sumner: M-1

Pierce County: EC (Employment Center)

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

Pacific: Open Space

Sumner: Light industrial

Pierce County: Open Space

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

Pacific: Urban Conservancy

Sumner: Urban Conservancy

Pierce County: Conservancy

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

Yes, portions of the project fall within the following areas: erosion hazard, fish and wildlife habitat, flood hazard, potential landslide hazard, wetlands, seismic hazard, and volcanic hazard.

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

None.

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

The residential property includes one house and two rental units, with approximately five people total.

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

The residents will receive fair market value for their homes, as well as relocation assistance from King County.

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

The proposed project, when completed, will remain compatible with the existing land uses in the area. Moreover, the completed project will enhance aquatic and terrestrial habitat conditions along the river bank and the gravel access road / informal foot trail on the levee crest will serve as a recreational amenity for pedestrians.

9. Housing

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

None.

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

One residential (middle-income) property with three residential units will be eliminated.

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

King County designed the project to take only the minimum number of residential units while maximizing the environmental and flood hazard reduction impacts of the project. The residents impacted by this project will receive fair market value for their homes, as well as relocation assistance from King County.

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 height of any proposed structure is the levee, the crest of which will be a maximum of 12 feet above the existing ground surface.

- b. *What views in the immediate vicinity would be altered or obstructed?*

There will be slight alteration in views due to the landward relocation of the setback levee. The levee will be higher in places, and therefore may impact views of the river or riverbank. Native plantings will also obstruct views of the river and wetland as viewed from the east.

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

The levee will not be constructed any higher than is required for flood risk reduction purposes (100-year flood protection plus 3 feet of freeboard). Most disturbed areas (see Question B.4.d.) will be replanted to restore native riparian vegetation within the river corridor. Over time, the aesthetics of the project site will be improved by converting areas currently overgrown with invasive plants to more beneficial native plant communities.

11. Light and Glare

- a. *What type of light or glare will the proposal produce? During what time of day would it mainly occur?*

None.

- b. *Could light or glare from the finished project be a safety hazard or interfere with views?*

No.

- c. *What existing off-site sources of light or glare may affect your proposal?*

None.

- d. *Describe proposed measures to reduce or control light and glare impacts, if any.*

There is no need for measures to mitigate light and glare impacts.

12. Recreation

- a. *What designated and informal recreational opportunities are in the immediate vicinity?*

The access road on top of the proposed setback levee serves as an informal foot trail and offers passive recreation opportunities, including walking, jogging, and bird/wildlife watching. Pacific City Park on the opposite bank of the White River offers passive and active recreation opportunities (ball fields, playground, grassy areas, and a walking path) as well as view of the project area. In-river use in this area has not been surveyed but is expected to be limited due to the cold and murky nature of the glacially fed river. Fishing and near-shore wading are believed to occur occasionally.

- b. *Would the proposed project displace any existing recreational uses? If so, describe.*

Over the long-term, existing recreational uses of the informal foot trail in its new alignment, and other passive uses like views are expected to continue. In the short term, access to the construction site will be restricted (May 2014 – November 2015) to implement necessary site safety standards, therefore eliminating access to the entirety of the project site.

The proposed project includes setting the levee back as much as 1200 feet from its current top-of-bank location. The proposal also includes installation of engineered log structures along the existing landward wetland boundary and within Wetland B. These project-related alterations likely will modify flow patterns and add hydraulic complexity that may create more dynamic river conditions previously observed or experienced by shoreline and in-river users while boating, floating, wading or fishing this reach of the White River. As with any river, recreationalists need to monitor and be prepared for changing river conditions and in-river hazards.

- c. *Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:*

The project will include a new gravel access road that serves as a public foot trail offering informal shoreline and upland recreational uses including walking/jogging, bird/wildlife watching, native plant identification and passive enjoyment of a natural area.

Shoreline and in-river recreational safety for the project area will be addressed in a number of ways.

1. **Planning and Design Phase:** King County adopted a public rule entitled Procedures for Considering Public Safety When Placing Large Wood in King County Rivers in 2010. Related actions specific to the Countyline Levee Setback Project include:
 - a. The project team presented the Countyline Levee Setback Project at King County's annual Large Wood Projects public meeting in 2011, and made the 30% plans available for review. A large wood safety checklist was prepared at this time and made available on the King County large wood projects website (King County 2011).
 - b. The project team will update the large wood safety checklist and present the 60% design at the annual Large Wood Projects public meeting in Spring 2013.
 - c. The project will undergo third party review by a professional boating and river safety consultant. This information will be incorporated into the final design.
 - d. A Public Safety Site Management Plan will be prepared for the Countyline Levee Setback project site. The purpose of this document is to describe adaptive management strategies to be employed at the project site to help protect public safety after project implementation.
2. **Public Outreach Regarding Possible Hazards:** King County maintains several web sites intended to share project information with the public.
 - a. Large Wood Installations: A list of projects where large wood will be or is likely to be installed in a King County river or stream is updated every year and made available by request and via the county website or e-mail notifications. The Countyline project is included on this list:
<http://www.kingcounty.gov/environment/watersheds/general-information/large-wood/project-list.aspx>.
 - b. Capital Improvement Projects Map: Although not hazard focused, this interactive map of King County Capital Improvement Projects (CIPs) managed by Department of Natural Resources and Parks allows users to search by geographic location for river projects.
<http://www.kingcounty.gov/environment/waterandland/projects-map.aspx>

- c. Known Hazards in King County Rivers: Intended to provide general information on known boating and river-related recreation hazards identified by the King County sheriff, this site is not to be considered an exhaustive list of river hazards. No written list of hazards can be considered a substitute for skill, knowledge, or judgment. Should the project area develop navigation hazards, it may warrant local specialized outreach (such as news releases or signage) and will be listed here: <http://www.kingcounty.gov/recreation/boating/rivers.aspx>
3. **General River Safety Outreach**: King County conducts a river safety campaign with two key messages: first, increasing awareness that rivers are inherently dangerous places to recreate; and second, promoting individual preparation and responsibility for those that choose to recreate in rivers.
<http://www.kingcounty.gov/healthservices/health/injury/water/riversafety.aspx>

13. Historical and Cultural Preservation

- a. *Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.*

There are no known places or objects listed on, or proposed for, inclusion on national, state or local preservation registers on or adjacent to the site.

In 2008, King County hired a professional archaeologist to conduct a literature review of environmental, historic, ethnographic, and precontact background material for the Area of Potential Effects. Due to moderate to high probabilities for historic cultural resources in the project area, additional cultural resources assessments were conducted on various dates between September 2009 and April 2011. This work included 1) monitoring of any geotechnical testing, 2) historical evaluation of the existing levee and the residential structures, and 3) archaeological fieldwork including surface and subsurface survey. Apart from the existing levee and a pair of concrete piers located outside of the project area (see 13.b.), no cultural resources – either prehistoric or historic – were observed during surface or subsurface survey, or during monitoring of geotechnical tests. Based upon these results, the professional archaeologist recommended no further cultural resources work within the Area of Potential Effects.

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

No evidence of prehistoric or historic cultural resources was found during the cultural resources investigations. Neither the existing levee nor the residential/rural structures meet the criteria for inclusion on the National Register of Historic Places. The concrete piers were recorded as an archaeological site but they are located outside of the project area.

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

During construction, King County will follow an Archaeological Resources Monitoring Plan which will describe procedures to be followed if cultural resources are encountered during construction. These procedures will include temporarily

suspending construction activities and securing the site, and consulting a professional archaeologist or the county coroner and local law enforcement. The monitoring plan will be reviewed and approved by the US Army Corps of Engineers during permit review to ensure compliance with Section 106 of the National Historic Preservation Act.

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.*

This project runs north to south, between the A Street SE (Auburn) and 8th Street E (Sumner) bridges. Access from these streets to the site will not change.

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

The closest bus stop appears to be the White River Junction (Ellingson Road and A Street SE), served by King County Metro Transit Route 180 as well as King County DART (Dial-A-Ride Transit) Route 917.

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

The project will not add or eliminate parking spaces.

- 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).*

No.

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

Yes, the project is adjacent to and ties into the Burlington Northern Santa Fe Railroad.

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

None.

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

Once the construction is completed, there will be no impact on transportation. King County will coordinate with the Cities of Sumner, Pacific, and Auburn, as well as Pierce County, to address transportation impacts anticipated during construction.

15. Public Services

- a. *Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.*
No.
- b. *Proposed measures to reduce or control direct impacts on public services, if any:*
There will be no impact on public services.

16. Utilities

- a. *Underline utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.*
- b. *Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity that might be needed.*

Proposed utility work is limited to removing existing utilities associated with the residential structures. The project design avoids existing utilities at the 8th Street E Bridge.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: Sarah McCarthy
Title: Senior Ecologist
Date Submitted: 10/09/2012

Countyline Levee Setback Project

Note: The finished project will emit no GHGs aside from those occurring in the environment by natural processes. All emissions are therefore related to construction of the proposed project.

Distance of project site from Renton Shops, a surrogate
for likely origin of vehicle trips from the Contractors' yards: 19.9 miles

Estimated days of construction activity:

<u>Vehicle</u>	<u>Miles/hours</u>	<u>Rate</u>	<u>fuel used</u>	<u>Em. Coef.</u>	<u>Emissions (lbs)</u>	<u>Tons (metric) CO₂e</u>
Pickup	7960	20.7	384.54	19.564	7523.16	3.36
Pickup	7960	20.7	384.54	19.564	7523.16	3.36
Pickup	7960	20.7	384.54	19.564	7523.16	3.36
Pickup	7960	20.7	384.54	19.564	7523.16	3.36
Pickup	7960	20.7	384.54	19.564	7523.16	3.36
Pickup	7960	20.7	384.54	19.564	7523.16	3.36
Diesel Impact Hammer	600	2	1200.00	22.384	26860.80	11.99
Diesel Impact Hammer	600	2	1200.00	22.384	26860.80	11.99
Track Drill	600	6.3	3780.00	22.384	84611.52	37.77
Track Drill	600	6.3	3780.00	22.384	84611.52	37.77
200 Class Excavator	720	7	5040.00	22.384	112815.36	50.36
200 Class Excavator	720	7	5040.00	22.384	112815.36	50.36
200 Class Excavator	720	7	5040.00	22.384	112815.36	50.36
200 Class Excavator	720	7	5040.00	22.384	112815.36	50.36
200 Class Excavator	720	7	5040.00	22.384	112815.36	50.36
200 Class Excavator	720	7	5040.00	22.384	112815.36	50.36
300 Class Excavator	720	10	7200.00	22.384	161164.80	71.95
300 Class Excavator	720	10	7200.00	22.384	161164.80	71.95
300 Class Excavator	720	10	7200.00	22.384	161164.80	71.95
300 Class Excavator	720	10	7200.00	22.384	161164.80	71.95
Articulated Dump Truck (20-25 CY)	600	7.4	4440.00	22.384	99384.96	44.37
Articulated Dump Truck (20-25 CY)	600	7.4	4440.00	22.384	99384.96	44.37
Articulated Dump Truck (20-25 CY)	600	7.4	4440.00	22.384	99384.96	44.37
Articulated Dump Truck (20-25 CY)	600	7.4	4440.00	22.384	99384.96	44.37
Dump Truck (20 Ton)	6000	6.15	975.61	22.384	21838.05	9.75
Dump Truck (20 Ton)	6000	6.15	975.61	22.384	21838.05	9.75
Dump Truck (20 Ton)	6000	6.15	975.61	22.384	21838.05	9.75
Dump Truck (20 Ton)	6000	6.15	975.61	22.384	21838.05	9.75
Dump Truck (20 Ton)	6000	6.15	975.61	22.384	21838.05	9.75
Dump Truck (20 Ton)	6000	6.15	975.61	22.384	21838.05	9.75
D6 Dozer	600	5	3000.00	22.384	67152.00	29.98
D6 Dozer	600	5	3000.00	22.384	67152.00	29.98
D7 Dozer	720	6	4320.00	22.384	96698.88	43.17
D7 Dozer	720	6	4320.00	22.384	96698.88	43.17
D7 Dozer	720	6	4320.00	22.384	96698.88	43.17
D7 Dozer	720	6	4320.00	22.384	96698.88	43.17
Soil Compactor	600	5	3000.00	22.384	67152.00	29.98
Soil Compactor	600	5	3000.00	22.384	67152.00	29.98
Heavy Equip Transport	1034.8	1.9	544.63	22.384	12191.03	6.10
TOTAL:					2785797.65	1244.31

Carbon Sequestration

Approximately 4,000 trees will be planted as part of this project. Of these, 1,500 are categorized as moderately-growing hardwoods, 1,500 as fast-growing hardwoods, and the remaining 1,000 as slow-growing conifers. The carbon sequestration rates of these trees was calculated using data tables from the U.S. Department of Energy, Energy Information Administration.

Using these data tables, the proposed plantings (assuming an 80% survival rate) will sequester **1,283 metric tons of carbon within 36 years of their planting.**