



DEPARTMENT OF THE ARMY  
SEATTLE DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 3755  
SEATTLE, WASHINGTON 98124-3755

REPLY TO  
ATTENTION OF

CENWS-PM-CP

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**Riverview Park Ecosystem Restoration  
Side Channel Construction  
City of Kent, King County, Washington**

**FINDING OF NO SIGNIFICANT IMPACT**

**1. Background.**

**a. Purpose.**

The current habitat quality of the Green River valley is highly degraded. This degradation takes the form of stream channelization, increased sedimentation, impaired water quality, minimal wetland and riparian buffers, and disturbed hydrological regimes. The Green River, restricted by riprap and earthen levees, is no longer able to enter its flood plain; and therefore natural channel migration processes, riparian corridors, wetland development, off-channel habitat, and large woody debris (LWD) recruitment have been virtually eliminated in the middle and lower Green sub-watersheds. All of these elements are crucial to the formation of suitable salmonid habitat.

Reduction and elimination of side channel forming process in the lower and middle river has been identified as a limiting factor for salmonid spawning and rearing (Fuerstenberg et al. 1996.)

The project purpose is to create off channel habitat for Chinook rearing and winter high flow refuge. The project will include native plantings and LWD, both of which are integral to the development of salmonid and other wildlife habitat.

**b. Authority.**

Section 306 of the WRDA of 1990 authorized the Secretary of the Army to include environmental protection as one of the primary missions of the Corps. Authorization for the Green/Duwamish River Basin Ecosystem Restoration Project, General Investigation (GI) was received under Section 209 of Public Law 87-874, Puget Sound and Adjacent Waters. Congress specifically authorized the Green/Duwamish River Basin Ecosystem Restoration Project (ERP) in Section 101(b)(26) of WRDA 2000. This project is a separable element of the Green/Duwamish ERP. The Green/Duwamish ERP gained construction New Start capability in the Water and Energy Act of 2003.

**2. Proposed Action.**

The Corps is proposing to excavate an approximately 800-foot flow-through side channel and a depth of 24 ft at approximately RM 23.7 in Riverview Park on the Green River. An assortment of slope protection methods would be utilized to ensure stability. In-stream habitat features would be installed including log clusters and native plants. A pre-fabricated bridge would be



installed across the channel to provide truck and emergency equipment access to the island. Bollards will be installed to ensure access by authorized vehicles only.

The bridge will ensure maintenance of the plantings and weed control can be done in an efficient manner further increasing the likelihood of project success. Public safety concerns would be met by providing access for emergency equipment to the island.

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### **3. Summary of Impacts and Compliance.**

Unavoidable adverse effects associated with this project are expected to include noise disturbance to wildlife, homeowners, and recreational users. Disruption of local traffic in the project vicinity during construction will be unavoidable, but there will be utilization of proper signage and flaggers to address safety concerns and to conduct efficient traffic control. New native plantings onsite will compensate for the mortality of some trees and shrubs in the project site. Human use of the site may increase after project completing due to construction of the bridge. Bollards will be installed on the bridge to restrict access to only authorized vehicles.

The negative environmental effects of the Riverview Park Side Channel construction are temporary or minor and are associated primarily with the actual construction of the project, mainly the conversion of the existing site conditions to a new side channel and rewatering of the side channel as it is joined with the Green River. The combination of mitigation measures and BMPs reduce the short-term (i.e. construction related) impacts of these projects to an insignificant level. More importantly, the beneficial effects generated by the project compensate for these short-term negative effects. Thus, the proposed restoration project will have beneficial cumulative effects within the watershed and will incrementally offset adverse impacts on habitats from past, present, and future redevelopment projects along the Green River.

The Corps finds this project is “not likely to adversely affect” federally listed species or critical habitat under the Endangered Species Act. Concurrence was received from National Marine Fisheries Service on 8 April 2010 and United States Fish Wildlife Service on 14 April 2010. This project complies with Section 404 of the Clean Water Act. The Corps has prepared a 404(b)(1) evaluation to document findings regarding this project pursuant to Section 404 of the Act as well as Section 10 of the Rivers and Harbors Act of 1899. This document can be found in Appendix B of the Environmental Assessment. A 401 water quality certification was received from Washington Department of Ecology on 10 May 2010. Section 402 of the Clean Water Act requires a National Pollutant Discharge Elimination System (NPDES) permit and the associated implementing regulations for General Permit for Discharges from Large and Small Construction Activities for construction disturbance over one acre. This project will have land disturbance of over one acre and therefore a NPDES permit will be obtained by the contractor prior to ground disturbing activities. This project will not cause substantial adverse effects to shore resources or the environment. After review of the City of Kent Shoreline Master Plan, the Corps believes this project is consistent to the maximum extent practicable. The Department of Ecology concurred with the Corps’ determination in a letter dated 10 May 2010. The Corps has initiated consultation with the Washington State Historic Preservation Officer (SHPO) and the Muckleshoot Tribe of Indians (Muckleshoot) for the project and found that the project would result in “No Historic Properties Affected.” The Corps received concurrence from the SHPO on 10 May 2010. The Corps contacted the Muckleshoot Tribe Cultural Department by a letter dated 12 February 2010 and has received no response to date.



The draft EA was available for public comment from 19 April 2010 to 20 May 2010. Comments were received from the Muckleshoot Tribe and have been addressed as detailed in the final EA.

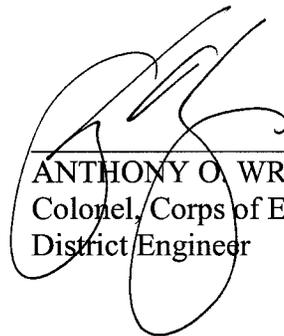
**4. Finding.**

Based on this Environmental Assessment and coordination with Federal agencies, Native American Tribes, and State agencies, the Riverview Park Side Channel project is not expected to result in significant adverse environmental impacts. The Riverview Park Side Channel project is ~~not considered a major Federal action having a significant impact on the human environment.~~

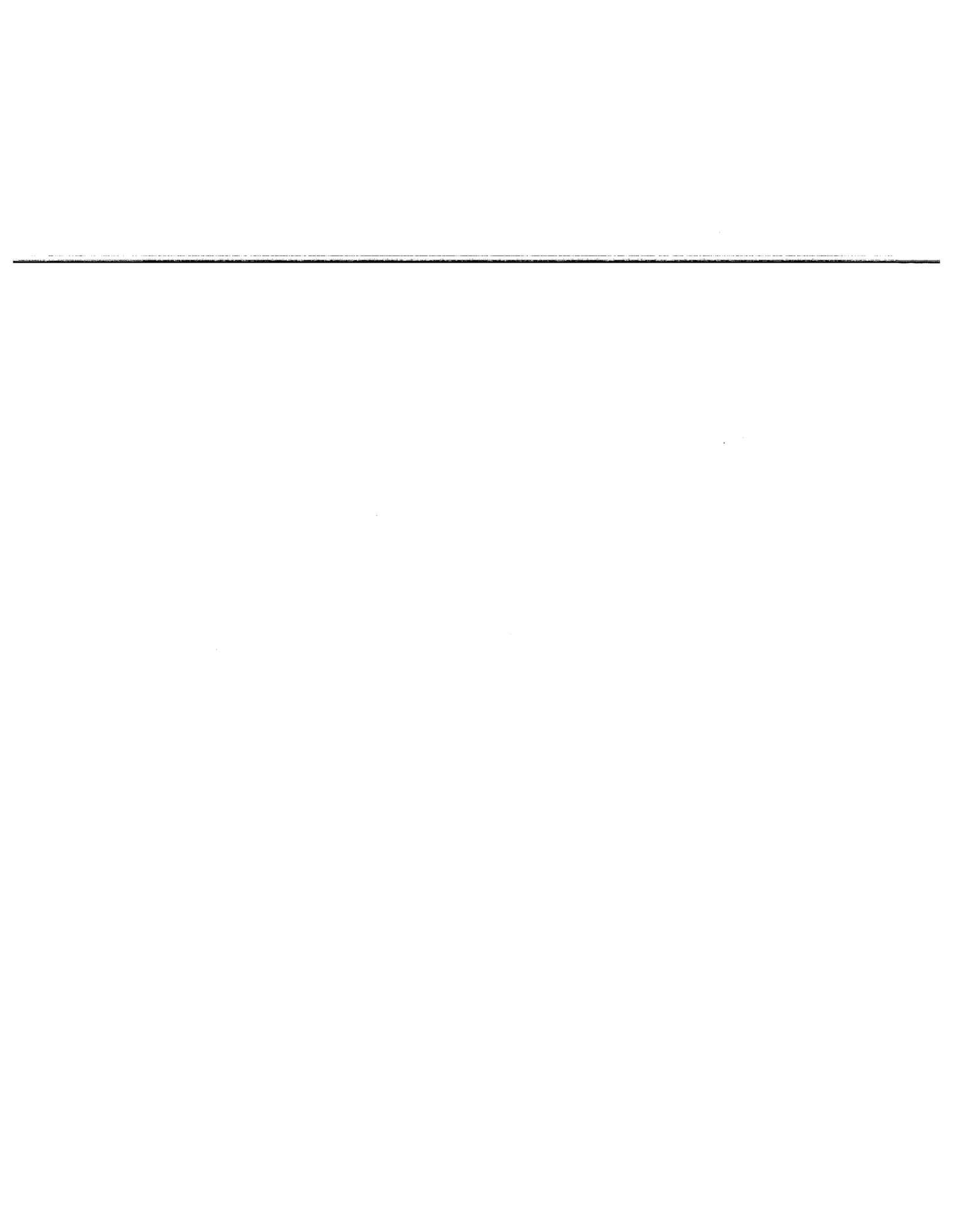
Therefore, the preparation of an environmental impact statement supplement is not required.

Based on information received to date, I have determined that the proposed action will not result in significant adverse environmental impacts.

Date 12/5/2011



ANTHONY O. WRIGHT  
Colonel, Corps of Engineers  
District Engineer



# Final Environmental Assessment

## Riverview Park Ecosystem Restoration Side Channel Construction

a separable element of the  
Green-Duwamish River Basin  
Ecosystem Restoration Project

Kent, Washington  
July 2011



US Army Corps  
of Engineers®  
Seattle District

# Riverview Park Ecosystem Restoration Side Channel Construction

Final Environmental Assessment  
July 2011

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**Responsible Agencies:** The agencies responsible for this project are the U.S. Army Corps of Engineers, Seattle District (Corps), and the City of Kent.

**Summary:** The Green River, restricted by riprap and earthen levees, is no longer able to enter its flood plain; and therefore natural channel migration processes, riparian corridors, wetland development, off-channel habitat, and large woody debris (LWD) recruitment have been virtually eliminated in the middle and lower Green sub-watersheds. All of these elements are crucial to the formation of suitable salmonid habitat. Without restorative action, many of the fish and wildlife resources of the Green/Duwamish system would continue to decline.

The U.S. Army Corps of Engineers (Corps) and the City of Kent are proposing to construct an approximately 750 linear foot flow-through side channel to the Green River through Riverview Park, along with native riparian planting on both sides of the channel. The primary goals for this project, as stated in the Feasibility Report, is to provide summer rearing habitat and establish a flow through winter channel refuge for fish during high/flood flows in the mainstem Green River. In accordance with the National Environmental Policy Act (NEPA), this document evaluates the potential environmental impacts of the proposed restoration alternatives.

The project does not constitute a major Federal action that will significantly affect the quality of the human or natural environment. The Corps will use best management practices to minimize potential adverse effects to aquatic and terrestrial resources. Impacts to air quality, noise, and water quality will generally be highly localized and short in duration. There are no wetland impacts associated with this project.

THE OFFICIAL COMMENT PERIOD FOR THIS ENVIRONMENTAL ASSESSMENT WAS FROM 19 APRIL 2010 TO 20 MAY 2010.

This document is available online under the project name "Riverview Park" at:  
[http://www.nws.usace.army.mil/ers/doc\\_table.cfm](http://www.nws.usace.army.mil/ers/doc_table.cfm).

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## INTRODUCTION

The U.S. Army Corps of Engineers (Corps) and the City of Kent propose to construct an approximately 750 linear foot flow-through side channel to the Green River through Riverview Park. The primary goal for this project is to increase valuable off-channel summer rearing habitat and refugia during winter high flow events for juvenile salmonids.

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~~This off-channel habitat is quite rare in the lower Green River due to degradation caused by channelization, and urban and suburban development.~~

This restoration activity is being conducted as part of the Green/Duwamish River Basin Ecosystem Restoration Project (ERP). In the ERP, the Corps has served as the lead in developing the restoration projects for the Green/Duwamish River, working with local agencies to identify, evaluate, prioritize, and coordinate implementation of potential restoration projects to assure that the restoration programs and projects from the various agencies complement each other. As part of this ecosystem approach, two major documents have been prepared that provide general information regarding the Green/Duwamish River basin and its associated existing conditions, fish and wildlife populations, and potential impacts on federally listed endangered or threatened species. The documents are as follows:

Final Programmatic Environmental Impact Statement and Restoration Plan (FPEIS) for the Green/Duwamish River Basin Ecosystem Restoration Project, prepared by the USACE, Seattle District and King County DNR in November 2000.

Programmatic Biological Assessments for Green/Duwamish Ecosystem Restoration Project, King County, Washington. Separate documents were prepared for species under National Marine Fisheries and US Fish and Wildlife jurisdictions for the USACE, Seattle District by Jones & Stokes, June 2000.

Information from these reports has been incorporated into this document largely by reference. Consultation was reinitiated with the Services for this project to cover species and critical habitat (Puget Sound steelhead, Puget Sound Chinook salmon critical habitat and Coastal/Puget Sound bull trout critical habitat) that have been listed or designated after the Programmatic BA was submitted to the Services.

The FPEIS assessed the Corps proposal to implement a basin-wide restoration program in the Green/Duwamish River. The programmatic Green/Duwamish Ecosystem Restoration Project EIS can be assessed online under the project name "Green Duwamish Ecosystem Restoration" at:

<http://www.nws.usace.army.mil/ers/index.cfm?status=1>

The purpose of preparing a programmatic EIS was to expedite and provide a point of departure for future site-specific projects, and to facilitate the preparation of subsequent project-specific National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) documents through the use of "tiering" or "phasing" individual project actions. Significant or potentially significant impacts identified in the project specific EAs that were

disclosed in the program EIS do not require the preparation of supplemental EIS since they have already been disclosed to the public in the programmatic EIS.

Restoration features at sixty-seven projects in the basin were developed and evaluated to determine the most cost effective and beneficial plan to recommend for restoration of the basin ecosystem. The recommended plan would implement a combination of 45 project-specific and programmatic restoration measures throughout the basin. Riverview Park, formerly know as Green River Park, is one of these. Four of these 45 projects have already been implemented by the Corps. This recommended National Ecosystem Restoration (NER) Plan was selected based upon cost effectiveness and incremental cost evaluation of alternative's costs and environmental outputs. The recommended NER Plan restores aquatic and terrestrial ecosystem continuity and connectivity and addresses all limiting habitat factors for fish and riparian and riverine associated wildlife.

The purpose of this tiered Environmental Assessment is to provide information to the public about this project's environmental effects and to solicit public comments on the proposed action.

### **1.1 Project Location**

The project site, near River Mile (RM) 23.7, is located within the City of Kent (the local sponsor) on the right bank of the Green River near the confluence with Mill Creek and just west of SR167 Bridge crossing in the northwest quarter of Section 25, Township 22 North, and Range 4 East of the Willamette Meridian in Kent, King County, Washington (Figure 1).

The side channel construction is to occur within a 12-acre City of Kent undeveloped park parcel, Riverview Park. Riverview Park is bounded to the north, west and south by the Green River and to the east by Hawley Road.

### **1.2 Project Background**

This project is a separable element of the Duwamish/Green ERP, authorized by Section 101(b)(26) of the Water Resources Development Act of 2000, Public Law 106-541, and to be implemented in accordance with the plans and conditions provided in the final report of the Chief of Engineers. In the Chief of Engineers' final report dated 29 December 2000, this project was listed as "Green River Park". A conceptual design and cost estimate was prepared in 1998 as part of feasibility phase. The original design in the feasibility report showed a dead end channel; however flow-through channels have been shown to be more productive and have less siltation issues, therefore the Corps and the City of Kent moved forward with design and evaluation of a flow channel. The Duwamish/Green ERP gained construction New Start capability in the Water and Energy Act of 2003. The project was renamed Riverview Park in early 2006 when the period of design was initiated with the City of Kent.

Riverview Park is an undeveloped parcel of land currently owned by the City of Kent Parks Department (Kent Parks). At one time, Kent Parks had proposed converting the open space of Riverview Park into a formal recreation park to include parking, picnic and restroom facilities, and a hand-carry boat ramp. The Corps' Riverview Park Side Channel

Construction project was to be a part of this master plan. The lands for both pieces of the project (restoration and recreation) were purchased by the City of Kent, using non-Federal grant funds, in 2005. Kent Parks was responsible for designing and constructing the recreational park and the City of Kent Public Works was responsible for the restoration project. As of this date, Kent Parks' proposal to develop the parcel adjacent to the side channel into a formal park has been deferred due to budget and personnel constraints. In the future, if funds become available, Kent Parks may chose to develop the adjacent land as a recreational park. The local sponsor for the Side Channel Construction (the project discussed herein) is Kent Public Works.

### 1.3 Project Need

The purpose and need statement for the Programmatic Final NEPA/SEPA Environmental Impact Statement (DEIS) and Restoration Plan was to improve the overall health of the Green/Duwamish River basin ecosystem for fish and wildlife species by increasing the quantity, quality, diversity, and connectivity of available habitat. The need for such improvement to the ecosystem was well established from years of study conducted by the U.S. Army Corps of Engineers, King County, the Port of Seattle, the Muckleshoot Indian Tribe Fisheries Department, the Washington State Department of Fish and Wildlife, and others.

The overall objective of the restoration project is to restore significant ecosystem function, structure, and dynamic processes that have been degraded within the river basin. To accomplish this objective, the following basin-wide restoration goals were identified:

- Improve the physical nature of existing degraded habitat.
- Improve existing ecosystem functions and values. This includes improving riverine processes where reasonable.
- Address important factors limiting habitat productivity.

Deforestation, urban, industrial and residential development, and the requisite flood control facilities (Howard Hanson Dam and the nearly complete system of levees) in the Green River valley have caused considerable degradation of the river and associated habitats. This degradation takes the form of stream channelization, increased sedimentation, impaired water quality, minimal wetland and riparian buffers, and disturbed hydrological regimes. Levees and artificial control of river flow by Howard Hanson Dam (HHD) have forever altered natural ecosystem processes and directly led to the decline of salmon in the watershed. The Green River, restricted by riprap and earthen levees, is no longer able to enter its flood plain; and therefore natural channel migration processes, riparian corridors, wetland development, off-channel habitat, and large woody debris (LWD) recruitment have been virtually eliminated in the middle and lower Green sub-watersheds. All of these elements are crucial to the formation of suitable salmonid habitat. Without restorative action, many of the fish and wildlife resources of the Green/Duwamish system would continue to decline.

Construction of a side channel in Riverview Park would provide much needed off-channel habitat in the middle and lower reach of the Green River. Reduction and elimination of side

channel forming process in the lower and middle river has been identified as a limiting factor for salmonid spawning and rearing (Fuerstenberg et al. 1996.). This scarce off-channel habitat has been almost entirely lost in the lower Green River due to the presence of levees, bridge abutments, roads, and encroachment of human development.

#### **1.4 Project Purpose**

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The project purpose, as stated in the feasibility report, is to create off channel habitat and winter high flow refuge for juvenile salmonids. Restoration of habitat for juvenile salmonids will also provide current and future (by increasing recruitment to subsequent life history stages) foraging opportunities for other species of fish and wildlife including ESA listed species such as bull trout and southern resident orca whales, as well as predatory birds and waterfowl. The project would include native plantings and LWD, both of which are integral to the development of salmonid and other wildlife habitat, including birds and small mammals.

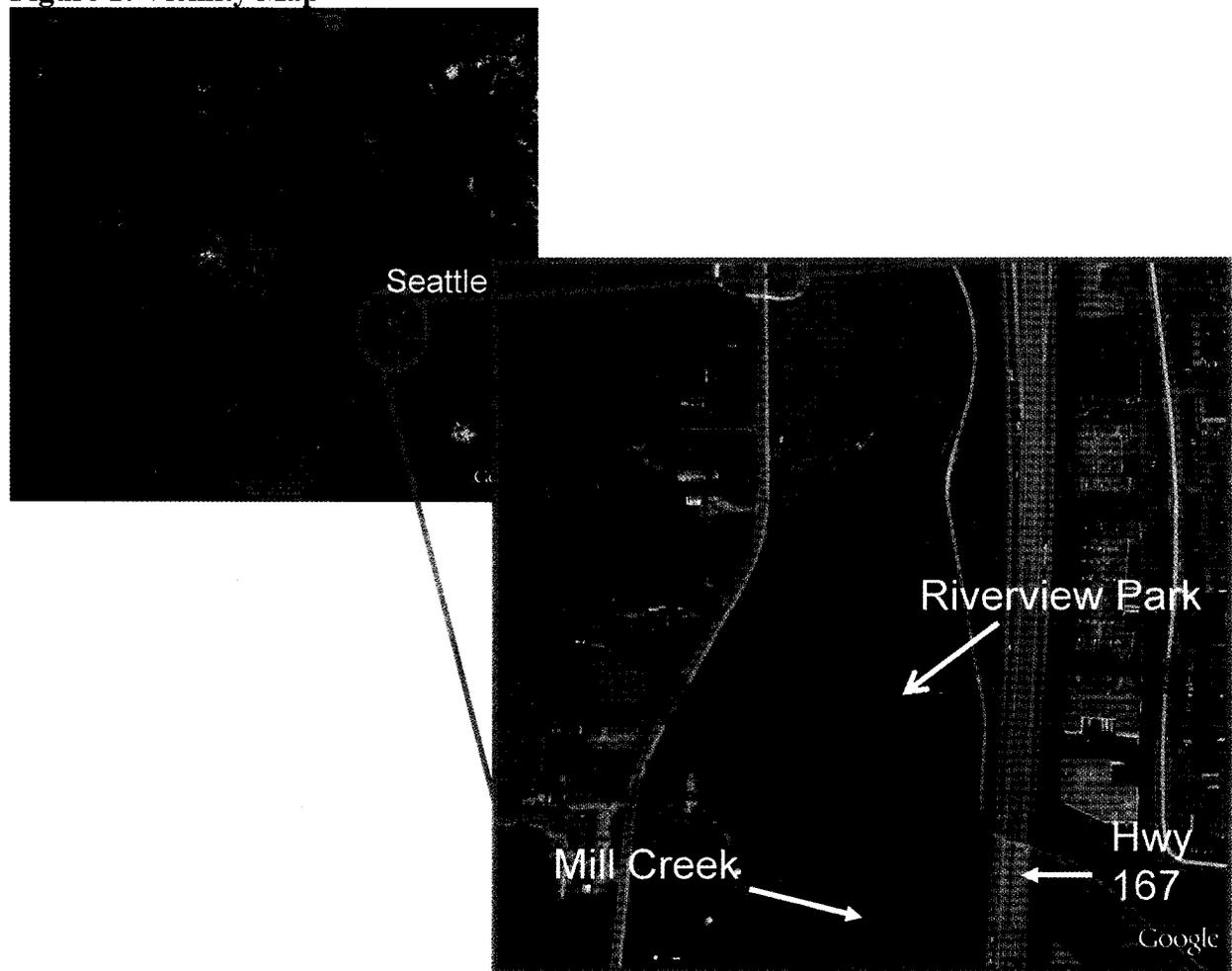
#### **1.5 Authority**

Federal involvement in ecosystem restoration is supported in law and Executive Order. The Corps Civil Works Ecosystem Restoration Policy (ER 1165-2-501), the Fish and Wildlife Coordination Act of 1958, Federal Water Project Recreation Act of 1965, National Environmental Policy Act of 1969, Water Resource Development Act (WRDA) of 1986, and the WRDA of 1990 provide national policy directing consideration of projects that benefit ecological resources.

Specifically, Section 306 of the WRDA of 1990 authorized the Secretary of the Army to include environmental protection as one of the primary missions of the Corps. Authorization for the Green/Duwamish ERP General Investigation (GI) study was provided under Section 209 of Public Law 87-874, Puget Sound and Adjacent Waters. Congress specifically authorized the Green/Duwamish River Basin Ecosystem Restoration Project (of which this project is a part) in Section 101(b)(26) of WRDA 2000. The Duwamish/Green ERP gained construction New Start capability in the Water and Energy Act of 2003.

The City of Kent is the non-Federal sponsor for the Riverview Park project evaluated in this document. The Corps and the City of Kent have cooperated in regular interagency meetings from which the objectives for the proposed restoration work were developed.

**Figure 1: Vicinity Map**



### **1.6. Associated Studies and Reports**

General information regarding the Green/Duwamish River basin and its associated existing conditions, fish and wildlife populations, and potential impacts on federally listed endangered or threatened species is adopted in this document by reference to the:

- Final Programmatic Environmental Impact Statement and Restoration Plan (FPEIS) for the Green/Duwamish River Basin Ecosystem Restoration Project, prepared by the Seattle District Corps (Corps) and King County DNRP in November 2000.
- Green Duwamish Ecosystem Restoration Study, Final Feasibility Report, prepared by the Seattle District Corps, October 2000.

- Programmatic Biological Assessments for Green/Duwamish Ecosystem Restoration Project, King County, Washington. Separate documents were prepared for species under National Marine Fisheries and US Fish and Wildlife jurisdictions for the Seattle District Corps by Jones & Stokes, June 2000.
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- Habitat Limiting Factors and Reconnaissance Assessment Report, Green/Duwamish and Central Puget Sound Watersheds (WRIA 9 and Vashon Island), Washington Conservation Commission and the King County Department of Natural Resources, 2000.
  - Near-Term Action Agenda for Salmon Habitat Conservation, Green/Duwamish River and Central Puget Sound Watershed, Water Resource Inventory Area 9, May 2002.
  - Record of Decision (ROD) for the Green/Duwamish Ecosystem Restoration Project, Washington, 30, April 2002.
  - Seattle's Urban Blueprint for Habitat Protection and Restoration: Review Draft, prepared by the City of Seattle's Salmon Team, June 2001.

## **2.0 ALTERNATIVES ANALYSIS**

In order to comply with the National Environmental Policy Act (NEPA), CEQ rules, and Corps regulations, the Corps performed an analysis of potential alternatives to meet the purpose and need of the project. The programmatic Green/Duwamish EIS analyzed the following alternatives: No Action, Multi-Species Approach (designed to maximize benefits to multiple species of fish and wildlife), and Single Threatened Species Approach (focusing on habitat improvement for Chinook salmon). Three alternatives were evaluated under the latter two alternatives including: Ecosystem/Habitat Forming Method, Engineered Design and Constructed Habitat Method, and Integrated Method. The selected alternative was the Multi-Species Approach with an Integrated Method.

For the Riverview Project the Corps evaluated the no-action alternative as well as three alternatives for restoration of the site. The three alternatives differed in the installment of a bridge. The channel alignment was largely fixed for the following reasons: 1) The amount of land available for the project is constrained by the requirement that the city of Kent keep a majority of the land as a park for passive recreation; 2) the existence of mature riparian vegetation on the west end of the site moved the project alignment to the east, leaving a large contiguous section of land available for the park function; 3) placing the proposed channel alignment between the passive recreation park and the existing riparian vegetation limited the channel length to approximately 750 feet; 4) input from the Muckleshoot Tribe Fisheries Division, the local sponsor, and state and Federal agencies established that the channel would function best with year round flows; 5) soil properties set the average slope of the channel at 3:1. The alternatives are described below.

## **2.1 No Action Alternative**

Under the no-action alternative, no side channel would be built at Riverview Park. The quantity of off-stream and side channel habitat in the middle and lower Green River corridor, a limiting factor for salmonid rearing and spawning (Kerwin 2000), would remain unchanged.

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## **2.2 Construct the Dead End Channel Alternative (also known as a backwater slough)**

Under this alternative, a dead end side channel would be built at Riverview Park. The slough would be approximately 600 linear feet with an 8 foot bottom width and a 50 foot planted riparian zone. This alternative is not as beneficial to juvenile salmonids as flow-through channels, and also has to concerns over sedimentation. Sediment modeling and on-site observations indicates that a dead-end channel would fill in within five to ten years due to the finer nature of substrate in that reach of the Green River and the lack of flushing and mobilization of sediment, thus making it a non-functional and unsustainable alternative. This alternative was carried forward for detailed analysis based on its inclusion in the Report to the Chief of Engineers for the Green Duwamish Ecosystem Restoration Project.

## **2.3 Construct the Flow Through Side Channel Alternative**

Under this alternative, the side channel would be constructed as described below in Section 3.0, with a length of approximately 750 LF and a 20 foot bottom width. An assortment of slope protection methods would be utilized to ensure stability. In-stream habitat features would be installed including log clusters and native plants. There would be no foot access to the created island.

Without access to the island, maintenance of the newly installed plantings, including irrigation and weed removal, would be limited to the mainland side. This could result in mortality of many of the plantings and re-establishment of undesirable invasive plants on the island. Successful establishment of the native plantings is integral to the goals of the project and regular maintenance for the first several years would be required to ensure this occurs, therefore this alternative was rejected.

## **2.4 Construct the Flow Through Side Channel - Pedestrian Bridge Alternative**

Under this alternative, the side channel would be constructed as described in Section 3.0, with a length of approximately 750 LF and a 20 foot bottom width. An assortment of slope protection methods would be utilized to ensure stability. In-stream habitat features would be installed including log clusters and native plants. A foot bridge or similar small scale structure would be constructed across the channel.

This foot bridge would provide access to the island for maintenance of the plantings and weed control with hand held equipment and maintenance crews only. No trucks, mowers, or other large equipment would have access to the island and therefore landscape maintenance would be more time consuming, costly, and likely less effective. A foot bridge would only allowing for watering to take place as well, and installing a waterline would be too costly. In addition, the pedestrian bridge would provide public access to the island. This may result

in a public safety issue. If a citizen were to be hurt on the island, there would be no way for emergency equipment to come to aid quickly. This alternative was rejected for reasons of possible public safety issues and the difficulty watering and maintaining the riparian plantings.

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## **2.5 Construct the Flow Through Side Channel - Vehicle Bridge Alternative (Preferred)**

Under this alternative, the side channel would be constructed as described in Section 3.0, with a length of approximately 750 LF and a 20 foot bottom width. An assortment of slope protection methods would be utilized to ensure stability. In-stream habitat features would be installed including log clusters and native plants. A pre-fabricated bridge would be installed across the channel to provide truck and emergency vehicle access to the island. A gravity-fed drip/cistern irrigation system is specified to be used to irrigate the site. The vehicle bridge would allow a water truck to fill the cisterns periodically. Bollards would be installed to ensure access by authorized vehicles only.

Construction of the larger bridge would require additional design and increase costs. However, the bridge would ensure maintenance of the plantings and weed control can be done in an efficient manner further increasing the likelihood of project success. Public safety concerns would be met by providing access for emergency equipment to the island. The bridge design is wide span, therefore all portions of the bridge would be outside of the channel and will have minimal or no impacts on its habitat benefits. Therefore this is the preferred alternative.

## **3.0 DETAIL DESCRIPTION OF THE PREFERRED ALTERNATIVE (SEE APPENDIX A FOR PROJECT PLANS)**

### **Flow Through Side Channel with Vehicle Bridge Design**

The project consists of excavating an approximately 750-foot flow-through side channel at approximately RM 23.7 in Riverview Park on the Green River. The inlet to the channel would join the Green River just upstream of the confluence with Mill Creek. The side channel would reconnect with the right bank of the Green River approximately 1,150 linear feet downstream of the inlet. Both the inlet and the outlet alcoves would be widened at the mouth (60 ft across and 90 ft across respectively) to provide additional habitat area in the transition zones between the Green River mainstem channel and side channel project. See plan sheet C-01 for the channel configuration. The excavation of this channel would require the removal of approximately 60,000 cubic yards of material, most of which would be placed in the park on the landward side east of the channel, creating a 2.24 acre island to the west. The basic cross-section for the side channel at Riverview Park is a composite trapezoidal section approximately 24 feet deep with a 20 ft base width. This depth would place the bottom of the channel below the observed groundwater table and ensure that the channel flows approximately 90% of the year. In general, the channel would have side slopes of 2H:1V on the lower 8 feet of the section and 3H:1V slopes above but varies in many places, to preserve trees and to provide a diversity of habitat. See plan sheet C-09 for channel cross section.

Several types of slope protection would be incorporated into the design to stabilize the channel slopes as well as to maximize habitat quality and diversity. Rock slope protection was minimized to the extent possible. The slope protection design also reflects constructability issues and constraints, (i.e. the in-water work window) and preservation of existing trees at the project site. Riprap would be used to protect the lowest two feet of the channel, reinforce the western access road, and protect the inlet and outlet from scour. Rock stabilization at the lowest elevation of the channel was deemed necessary as this area is anticipated to be underwater eighty percent of the time. Saturated conditions of this type are not ideal for reinforced soil lifts, vegetation establishment, or coir fabric durability. In addition to the inlet and outlet of the channel, the design specifies riprap above the access ramp on the southwest side of the channel. This rock reduces the need for construction over-excavation in this area and preserves the grove of trees existing on that part of the site.

The design specifies fabric-reinforced soil lift slope protection on the lower eight feet of the channel cross section above the rock toe, and areas with slopes of 2H:1V or steeper. The fabric-reinforced soil lifts feature a topsoil nose that would promote vegetation establishment on the bank. The design specifies coir fabric blanket for the upper portions of the channel section and other locations where slopes are equal to or milder than 3H:1V. The coir fabric blanket would help provide erosion protection from overland and stream flows while vegetation establishes on the site.

### **In Stream Features**

In-stream habitat features would include 17 wood debris installations (log clusters), along with single log configurations, typically positioned at the interior of the bends in the side channel, to enhance habitat diversity. In addition, the log clusters would serve to deflect flows and reduce the potential for scour at the toe of the channel. Native plantings would be installed in and around the log clusters to encourage deposition behind and within the log clusters, and create "habitat benches" in a more natural and dynamic form than might be achieved with an engineered reinforced soil fabric lifts installation. See plan sheets C-05 and C-06 for log cluster placement and C-22 and C23 for log cluster design.

Riprap used as slope protection in the stream bed would be faced with rounded river rock and the bottom of the stream would be lined with appropriately sized river rock and gravel to provide a more natural habitat and meet the project objectives of summer rearing and winter refuge habitat.

### **Vehicle Bridge**

The final element of the proposed project is the installation of a pre-fabricated vehicle bridge to connect the newly created island with the mainland and provide emergency access for public safety. The bridge abutment foundations would be constructed of micropiles (concrete with a single reinforcing bar) which would be drilled into the ground, approximately 50ft deep depending on soil and geotechnical conditions. The micropiles would be topped with a reinforced concrete pile cap and retaining walls. All parts of the bridge abutments would be outside of the channel. After installation of the bridge abutments, a pre-cast concrete or steel-truss bridge 130 feet long by 12 feet wide would be installed using a crane. The channel banks under the bridge would be reinforced using soil

lifts and planted with appropriate native vegetation as per the rest of the channel. See plan sheet C-03 for bridge placement and C-09 for bridge design.

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### **Construction Sequencing**

The Corps estimates that construction activities will occur over approximately 175 working days with construction planned to occur in the spring and the summer. Selective clearing and grubbing, as specified to preserve existing trees, would be completed prior to heavy equipment arrival. All trees would be fenced off at the drip line, singularly or in groups, to ensure preservation. A stabilized construction entrance would be built at the terminus of Hawley Road, in the northeastern corner of the site. Staging areas would be located at this entrance (see plan sheet C-15 for location).

Approximately 600 feet of the side channel would be excavated, toe rock and slope bio-engineering installed, and log structures placed prior to opening the channel to the mainstem of the river. Dewatering of the channel would likely be necessary due to the elevation of the groundwater table in the area. Pumping rates and pump sizes would be established such that a dry working area can be economically maintained for all necessary construction activities. Soil stockpiles would be located so as not to interfere with construction activities (i.e. back from the channel) and would be stabilized with appropriate temporary erosion and sediment control measures throughout the duration of the project. Most of soil from the excavation would be used as fill (anticipated to be between 5 and 8 feet above existing grade) on the eastern side of the site to provide a barrier from SR 167. Any remaining excavation material would be disposed of at an upland location. All dewatering activity and stockpiling of material shall be in compliance with National Pollution Discharge Elimination System (NPDES) permit requirements, and be substantively compliant with all requirements of a Hydraulic Project Approval (HPA) as issued by Washington Department of Fish and Wildlife (WDFW) to the local sponsor. Temporary sediment ponds would be constructed on the eastern and southern perimeters of the site. These ponds would be used for the dewatering of the channel during construction and filled upon project completion.

The inlet/outlet would be constructed and connected to the Green River during the fish window established by Washington Fish and Wildlife (August 1 to August 31). The following sequence of events would occur during the connection of the inlet and outlet to the mainstem Green River:

1. Using a blocknet in an arced configuration, isolate the area around the outlet and the inlet where the cofferdam, or equivalent, would be installed.
2. Drag a beach seine through the area to remove any fish from the area.
3. Remove all collected fish from the area by seining, dip nets, or ,when all other methods have been exhausted, electrofishing. Immediately transfer the collected fish to free flowing water downstream of the project area, or upstream of project reach if directed by the biologist. Any transfer of ESA (Endangered Species Act) listed fish would be conducted

using a sanctuary net that holds water during the transfer. All fish rescue would be performed by a qualified biologist with experience sampling and handling fish. All staff working with rescue must have necessary skills in knowledge, skills, and abilities to ensure safe handling of fish. If electroshocking, protocols shall adhere to National Marine Fisheries Service electroshocking guidelines (NMFS, 2008).

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4. Install stream flow diversion (cofferdam or equivalent). Close off openings through cofferdam and seal cofferdams with plastic sheeting.

5. Dewater project area using pump system with appropriate screening on the intake. Water pumped from the project area shall be pumped to the temporary sediment ponds located on the project site.

6. As the project area is dewatered, monitor project reach and rescue any fish from remaining pools. Transfer the collected fish to free flowing water downstream of the project reach or upstream of project reach.

7. Perform remaining excavation to targeted elevations to make connection with the river.

8. Install remaining bioengineered bank stabilization and in-stream habitat features.

9. Remove the cofferdam during the fish window.

The channel banks would be planted and appropriate stream bed gravels would be placed prior to side channel re-watering. The remainder of the plant installation would take place at the end of the project in early fall (September-October). Gravity-fed drip irrigation would be installed after planting and would remain in place for two to three years until plant establishment. The local sponsor, the City of Kent, would be responsible for maintaining the plantings and the channel integrity (see Draft Maintenance and Monitoring Plans, appendix G, for details on plantings).

## **4.0 EXISTING ENVIRONMENT**

Characteristics of the existing environment have been addressed in detail within a number of documents previously prepared as part of the Green/Duwamish River Basin Restoration Project. Characteristics of the existing environment that are specific to the lower Green River and the proposed project site are described in detail below based on reconnaissance work and review of available documentation. Rather than repeating information for the general Green/Duwamish River system here, that information is incorporated largely by reference to the documents listed in Section 1.6.

### **4.1 Topography, Geology, and Soils**

The history and physical characteristics of the Green/Duwamish River basin are described in detail in Sections 3.1 and 3.2 of the FPEIS (USACE, Seattle District and King County DNR 2000).

Riverview Park is located along the Green River at approximately RM 23.7 in the City of Kent in King County, WA. It is bordered along the western and southern side by approximately 2,600 linear feet of the Green River. This area of King County is changing rapidly from forested/rural to one that is heavily urbanized. Currently, the park is undeveloped open space (a six acre mowed field) used primarily by residents for passive activities: i.e. dog walking and flying model airplanes. The Green River Trail is located to the east of the park, partially in the footprint of Hawley Road. The site is mostly flat, with a narrow riparian corridor along the river. The banks of the river are very steep, providing little human access to the water.

The entire Green River corridor is within the area affected by the continental glacial advances that have shaped much of the topography of the Puget Sound Lowland. A series of ice advances from Canada scoured much of Washington and the northern half of the US. The most recent glaciations left deposits of gravels and compacted till material seen today in most of the soils and surface formations (Krukeberg 1991). The Green River originates in the Cascade Range south of Stampede Pass at an elevation of about 4,500 feet and flows northwest 90.5 miles to Elliott Bay through the North Cascades and Puget Lowlands ecoregions. The broad and flat lower Green River and Duwamish River basin is a glacial trough, eroded by sub glacial meltwater and scour of the glacier itself. The entire floor of the Green River Valley is composed of alluvium, which ranges in thickness from tens of feet in the upper end of the valley to probably over 120 feet in the lower end (Mullineaux 1970). The alluvium is composed of coarse channel deposits and finer overbank deposits. Channel deposits are predominantly gravel and sand that are transported as bedload and deposited on bars and on the channel bottom. These alluvial floodplain soils are subject to frequent flooding, seasonal ponding and a high water table. Riverview Park is identified as within the 100-year floodplain of the Green River in the Kent Shoreline Management Plan.

Soils in project area are mapped as primarily Pilchuck Series on the western side with a large band of Woodinville Series along the eastern edge of the property (USDA 2010). The Pilchuck series consists of excessively drained soils formed in alluvium on low stream terraces on slopes ranging from 0% to 2%. The Woodinville series consists of nearly level, poorly drained soils that formed in alluvium under grasses and sedges in a stream valley. The park was historically used for agriculture production; this likely involved the addition of topsoil to the site. Uniformity in soil type was verified during field observations.

#### **4.2 Hydrology**

The historic and current hydrological characteristics of the Green/Duwamish River basin are described in detail in Section 3.3 of the FPEIS (USACE, Seattle District and King County DNR 2000).

The Green River forms the western and northern boundary of the project site. The confluence of Mill Creek and the Green River is across from the property, just downstream of the inlet to the proposed side channel.

The lower Green River subwatershed begins at RM 32 near Auburn and extends through the project reach to Tukwila (RM 11). The historical diversions of the White River and the

Cedar /Black River from the Green River watershed have had major impacts on flow regimes in the lower river. The construction of Howard Hanson Dam (RM 61) in 1962 further contributed to degradation of the Green River. The dam's primary objective is flood control and thus river levels are artificially controlled to minimize losses and damage due to flooding. During the summer and fall, downstream flows are augmented by water held behind the dam. Diminished in-stream flows during the winter have limited flooding which forms off-channel habitat. Loss of sediment recruitment is another key concern to the health of the ecosystem. The lower Green River subwatershed is important for juvenile salmonid rearing; but flood control levees, water diversions, and urbanization have reduced the amount of suitable habitat in the reach. Most of the available spawning habitat exists in the upper portions of the mainstem, above RM 25.

In the project area the Green River flows through a broad, glacially carved valley. The river gradient is low and the river meanders in a deep channel that is confined by levees on both sides to a width of 100 to 200 feet. Fuerstenberg et al. (1996) calculated that approximately 80% of the river between RM 33 and RM 17 has a levee or revetment on at least one bank. These constrictions have led to increased velocity of flows through the lower basin due to reduced overbank storage. Overbank storage was historically provided by the wetlands and floodplains associated with the river and helped minimize peak flows and maximize low flows. Confining the river to a single channel has essentially cut the river off from its historic overbank storage, resulting in a loss of flow attenuation. Increased urbanization, resulting in increased stormwater runoff in the middle and lower basin has also affected flow velocity and attenuation (Corps 1997).

#### **4.3 Water Quality**

The historic and current water quality characteristics of the Green/Duwamish River basin are described in detail in Section 3.4 of the FPEIS (USACE, Seattle District and King County DNR 2000).

##### **4.3.1. DESIGNATED USES**

The Washington State Department of Ecology is responsible for setting water quality standards based on water use and water quality criteria. The Green River at the project site is designated for the following uses:

- Salmonid spawning and rearing
- Primary contact recreation
- Domestic water supply
- Industrial water supply
- Agricultural water supply
- Stock water supply
- Wildlife habitat
- Fish harvesting
- Commerce and navigation
- Boating
- Aesthetic values

In general, water quality improves progressively as one moves upstream. While the Green River maintains its high water quality rating, it also appears on Ecology's list of impaired waters. The mainstem of the river and many of its tributaries regularly violate state water quality standards for a variety of parameters (Corps 1997).

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#### 4.3.2. TEMPERATURE

Historically, water temperatures in the Green River basin were considerably lower than today; this is particularly true in the middle and lower reaches. The combination of channel width, depth, lack of shade-producing riparian vegetation and the dam/reservoir contributes to warming of the river during low flow periods in summer (Corps 1997).

The pre-settlement cover of dense riparian vegetation and associated wetlands is almost completely gone due to levees and development. This has resulted in the disconnection of the river from groundwater, which is generally naturally cooler than surface water and leads to streams and rivers with better water quality. Additionally the loss of riparian vegetation has resulted in almost complete loss of shading of the channel.

Additionally, Howard Hanson Dam/Reservoir has a dramatic effect on river temperatures downstream from the dam from June through October. Stored water temperatures can be considerably warmer than river flows, thus altering the temperature of the river downstream of the reservoir upon release during the summer months.

The proposed project is located in the lower Green River which is on Ecology's current 303d list for temperature (WDOE, 2008). High temperatures upstream may indicate even higher temperatures downstream as no additional shade or cold water source is present in the lower Green River to moderate the temperatures.

#### 4.3.3. NUTRIENTS AND DISSOLVED OXYGEN

In general, nitrate and ammonia levels in the lower Green River are highest during the winter, reflecting the source of pollutants from stormwater runoff, stormwater outfalls, and failing septic systems (Metro 1978).

Agricultural lands also contribute pollutants in the form of fertilizers and pesticides, primarily in the spring/summer months. However, the current trend in the lower basin is toward residential development of former agricultural lands. This has dramatically increased the amount of impervious surfaces and stormwater runoff in the lower basin, as well as increasing pollutants, such as petroleum products, pesticides and fertilizers (Corps 1997).

In addition, during periods of summer low flows, significant levels of ammonia from livestock and other non-point sources are quickly converted to nitrate, with a resulting depletion in dissolved oxygen (DO). DO levels that fail to comply with the state

standard have been recorded frequently enough in this stretch of the Green River and on Mill Creek during sustained low-flow periods to warrant placement on Ecology's 303[d] list (WDOE, 2008).

#### 4.3.4. FECAL COLIFORM

Fecal coliform bacteria are contributed to the tributaries and the mainstem Green River from domestic and farm animals pastured along the river. Additionally, failing septic systems can contribute to heightened fecal coliform levels.

Mill Creek, just upstream of the project site, is on the Washington Department of Ecology's 303(d) list for violation of standards for fecal coliform bacteria (WDOE, 2004).

#### 4.3.5. TURBIDITY AND SUSPENDED SEDIMENTS

Stormwater runoff occurs much faster across urbanized and agricultural lands than forested lands. Agricultural lands that are fallow and unvegetated during the rainy season can release significant amounts of fine sediment into the river. As agricultural land is converted to residential and commercial development, creating more impermeable surfaces, stormwater runoff greatly increases in speed and quantity, which may result in higher sedimentation and turbidity levels. With the exception of increased turbidity levels during high flow events, high turbidity is not currently a problem in the middle and lower Green River Basin.

### 4.4 Vegetation and Wetlands

The historic and current characteristic vegetation of the Green/Duwamish River basin are described in detail in Section 3.6 of the FPEIS (USACE, Seattle District and King County DNR 2000).

The project site is currently an undeveloped, mowed grass field, with a narrow riparian strip along the Green River shoreline. Large to medium diameter (8 to 24 inches) alders (*Alnus rubra*) and cottonwoods (*Populus balsamifera*) are the dominant trees; and several mature (30+ diameter) cottonwoods and big leaf maple (*Acer macrophyllum*) are interspersed throughout the western and southern edges of the site. A monoculture of thick blackberry (*Rubus armeniacus*) is present both in the riparian zone and along property line adjacent to Hawley Road.

No wetlands are present within or adjacent to the project area.

### 4.5 Fishery Resources

The historic and current characteristic fish communities of the Green/Duwamish River basin are described in detail in Section 3.5 of the FPEIS (USACE, Seattle District and King County DNR, 2000).

#### 4.5.1. FISH HABITAT

Juvenile salmon and trout rear in lower velocity areas, such as pools or side channels, in both the mainstem river and smaller tributaries (Groot and Margolis 1991).

Typically, the larger the fish, the larger the river or stream in which they spawn and rear.

Fish habitat in the lower Green River has been greatly reduced from historic conditions by the construction of Tacoma Diversion Dam, HHD, levees along the river banks, logging, and development within the riparian zone. These activities have contributed to the loss of fish habitat by severely reducing recruitment of LWD, preventing sediment transport, reducing slow water habitats (e.g., pools and side channels), and inhibiting nutrient transformation and retention.

#### 4.5.2. FISH USE

Over 30 fish species have been documented in the Green/Duwamish River. Among these are longfin smelt (*Spirinchus thaleichthys*), mountain whitefish (*Prosopium williamsoni*), largescale sucker (*Catostomus macrocheilus*), river lamprey (*Lampetra fluviatilis*), speckled dace (*Rhinichthys osculus*), longnose dace (*Rhinichthys cataractae*), three-spined stickleback (*Gasterosteus aculeatus*), northern pikeminnow (*Ptychocheilus oregonensis*) and freshwater sculpin species (*Cottidae* family). Exotic species such as bass (*Micropterus* spp.) and pumpkinseed sunfish (*Lepomis gibbosus*) may also be present.

The salmonid species in the Green River include both resident and anadromous stocks; species such as cutthroat trout (*Oncorhynchus clarki*), rainbow trout (*O. mykiss*), bull trout (*Salvelinus confluentus*), Dolly Varden (*S. malma*), steelhead (*O. mykiss*), Chinook (*O. tshawytscha*), coho (*O. kisutch*), pink (*O. gorbuscha*) and chum (*O. keta*) salmon. Resident fish are present in the lower river and the upper river including the reservoir area. Anadromous stocks are limited to the river system below Tacoma Diversion Dam, except where they are stocked or released in the upper basin (Corps 1997). Naturally spawning anadromous fish have been recognized as a critical link in the aquatic food webs of the region. They are considered a “keystone” species upon which producers and consumers from the bottom to the top of the food chain depend (Willson and Halupka 1995).

As federally threatened species, the occurrence and potential effects of the proposed project on Puget Sound Chinook salmon, Puget Sound steelhead, and Coastal/Puget Sound bull trout are addressed in Section 4.7 and 5.7.

## 4.6 Wildlife

The historic and current characteristic wildlife communities of the Green/Duwamish River basin are described in detail in Section 3.7 of the FPEIS (USACE, Seattle District and King County DNR, 2000).

Prior to European settlement, the middle and lower reaches of the Green River basin were predominantly covered with highly productive wetland and riparian habitat types. Presumably, abundant wildlife existed in the area, based on the high incidence of wetland habitats and forested areas.

Today, the remaining small patches of forest are predominately located around the scattered ponds, lakes and wetlands in the area. Few areas of forested riparian habitat exist along the river corridor. This remaining riparian habitat is a valuable wildlife resource to this area, but has been fragmented by agricultural use, road building, and urbanization. In addition, invasive non-native plant species shade and crowd native vegetation and provide habitat for generalist wildlife species and non-native animal species that outcompete native wildlife.

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Bird diversity remains high in the middle basin, but diminishes somewhat downstream in the lower basin where urban density is higher.

The dominant habitat type at the project site is mowed grass field which provides little to no wildlife habitat. Abundant mole (*Scapanus townsendi*) activity was noted throughout the field however. The peripheral areas of the site are covered in very dense blackberry which can provide habitat for small mammals and rodents, i.e. raccoons (*Procyon lotor*), opossums (*Didelphis virginiana*), squirrels (*Sciurus* spp.), mice (*Mus* spp.), and rats (*Rattus* spp.). Typical urban birds observed at the site include: sparrows (*Melospiza melodia*), robins (*Turdus migratorius*), crows (*Corvus brachyrhynchos*), chickadees (*Poecile atricapillus*), and finches (*Carpodacus mexicanus*).

Due to the proximity of the site to the Green River it is possible that bald eagle and other raptors may be occasionally present in the riparian trees.

#### **4.7 Threatened and Endangered Species**

The potential occurrence of federally listed threatened and endangered species within the Green/Duwamish River basin are described in detail in Section 3.7.2 of the FPEIS (USACE, Seattle District and King County DNR, 2000).

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed and proposed threatened or endangered species. In order to comply with this regulation, the Corps prepared two Programmatic Biological Assessments (BA) to assess potential impacts of the proposed work on species protected under the Act. These documents were submitted to the U. S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) for species under their respective jurisdictions:

- Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*) - Threatened (NMFS)
- Coastal/Puget Sound bull trout (*Salvelinus confluentus*) - Threatened (USFWS)
- Marbled murrelet (*Brachyramphus marmoratus*) - Threatened (USFWS)
- Northern spotted owl (*Strix occidentalis caurina*) - Threatened (USFWS)
- Gray wolf (*Canis lupus*) - Threatened (USFWS)
- Canada lynx (*Lynx canadensis*) - Threatened (USFWS)
- Bald eagle (*Haliaeetus leucocephalus*) - Threatened (USFWS)

Since the time of the initial consultations, bald eagle has been delisted and is no longer subject to ESA protection; Puget Sound steelhead have been listed as threatened, and Puget Sound Chinook salmon and Coastal/Puget Sound bull trout critical habitat has been

designated. Consultation on these species or their critical habitat was reinitiated for the Riverview Park Side Channel Construction project.

Of the above species, only Chinook, bull trout, and steelhead are found in the vicinity of the project site.

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#### 4.7.1. PUGET SOUND CHINOOK SALMON

Chinook salmon present in the Green River are classified as summer/fall run stocks (WDFW and Western Washington Treaty Indian Tribes 1994). As of 2002 the stock status of Green/Duwamish Chinook is healthy (WDFW, 2002). Adult Chinook salmon migrate upstream into the Green River from the Puget Sound from late June through November (Grette and Salo 1986). Most juvenile Chinook salmon in the Green River have an ocean-type life history, meaning that they migrate to the ocean during the year they emerge from spawning gravels (Lister and Genoe 1970; Healey 1991). Consequently, the fry outmigration period for Chinook salmon in the Green River extends from February through June. Preferred spawning areas for Chinook salmon in the Green River include the main river channel and large side channels upstream of RM 30.0 to the Tacoma Headworks diversion (RM 61.0). The proposed project site is downstream of this area.

The reach of the Green River adjacent to the project site is primarily a migration corridor due to lack of suitable spawning and rearing habitat. Habitat is limited in the site area due to lack of riparian vegetation which causes higher water temperatures and limits LWD recruitment. Lack of LWD and hardened stream banks from riprap placement reduces sedimentation and formation of pool/riffle systems, further reducing habitat.

#### 4.7.2. PUGET SOUND STEELHEAD

Puget Sound steelhead have a mapped range similar to Chinook salmon. However, within individual watersheds, steelhead have a broader distribution because they can spawn in smaller stream systems, can occur higher in a system, and in streams with steeper gradients (WSDOT 2007). Additionally, and more significantly, steelhead stocks are generally present in the streams year-round creating difficulty in defining in-water work windows. Steelhead are known to be present in the Green/Duwamish River year-round, however their presence is not well documented; most recent studies have focused on Chinook. The majority of steelhead found in the Green River remain in the river for two years and in the ocean for two years (Pautzke and Meigs, 1940). The Green River system supports both winter and summer stocks. As of 2002 the winter stock status was healthy, and the summer stock status was depressed (WDFW, 2002). The winter return adult wild steelhead in the Green/Duwamish begins in February but occurs predominately in March and April. The hatchery adult steelhead return is in November and December (Foley, personal communication). The smolts that out-migrate do so in April and May of each year and are usually larger than salmon as they would spend a minimum of two years in the river before going to salt water (Foley, personal communication).

#### 4.7.3. COASTAL/PUGET SOUND BULL TROUT

According to the USFWS Draft Recovery Plan, bull trout use eight core areas along the eastern side of Puget Sound (Chester Morse Lake, Chilliwack, Lower Skagit, Nooksack, Puyallup, Snohomish/Skykomish, Stilliguamish, and Upper Skagit). Adult and sub-adult bull trout from these core areas would migrate into the mainstem Green river to utilize it as foraging grounds, but no reproducing population exists within the watershed (USFWS 2004, King County 2001). Bull trout have historically been recorded in the Green River and a bull trout was captured near the mouth of Newaukum Creek in 2000. There is ample evidence from captures that anadromous bull trout regularly use the lower Duwamish River downstream of RM 5.8, especially in the spring (Goetz, personal communication). No bull trout have been found in recent surveys of the upper basin upstream of HHD. Regardless, USFWS has designated bull trout critical habitat in the lower and middle Green River based on its use as foraging habitat.

#### 4.8 Cultural Resources

The cultural and historic resources of the Green/Duwamish River basin are described in detail in Section 3.16 of the FPEIS (USACE, Seattle District and King County DNR 2000).

A search of the archaeological and historic site records at the Washington State Department of Archaeology and Historic Preservation (DAHP) indicated that no properties listed in the National Register of Historic Places (NRHP) or the Washington State historic site register are recorded within the project area. Although no cultural resources have been previously recorded within the project area, the project's location at the confluence of two salmon streams represents an area likely to contain evidence of cultural resources. The Corps performed an archaeological investigation of the project area of potential effect (APE), including a pedestrian reconnaissance survey and intensive shovel testing. No archaeological deposits or historic properties were encountered during the investigation.

#### 4.9 Hazardous and Toxic Material

A Preliminary Assessment Screening (PAS) was performed by the Environmental Engineering and Technology (ET) Section of the Corps to determine whether any hazardous or toxic material is present on or around the site that could affect project activities. State and local government environmental databases were reviewed and the proximities to the nearest hazardous waste generators, facilities, underground storage tanks, and leaking underground storage tanks were documented. Historical aerial photos and real estate records were reviewed to identify activities or property uses that may have contributed hazardous material to the project site. Previous reports were reviewed to identify any environmental concerns. Additionally, in order to observe signs or indications of the presents of hazardous waste, a site reconnaissance was performed by an environmental engineer from the Corps while being accompanied by an owner representative. The PAS report documents the findings and is available on request (USACE, 2010).

The PAS found that the site had been used for agricultural and residential purposes for the time period from approximately 1900 to 1994, at which time the land was acquired by the

outdoor burning and wood stoves (WDOE, 2009). In 2008, the Puget Sound Clean Air Agency reported that Puget Sound was in attainment for CO<sub>2</sub>, NO<sub>2</sub>, SO<sub>2</sub>, and lead, and the percentage of days air quality was considered to be good in King County was 78%, the percentage of days that air quality was “moderate” was 21%, and percentage of days where the air quality was considered “unhealthy for sensitive groups” occurred 1% of the time, likely during times of stable weather when there is an absence of wind. In the winter months, temperature inversions can occur as a result of low solar heating. During these occasions, high concentrations of pollutants associated with wood burning (stoves and fireplaces) and transportation sources can occur. This condition is intensified by the topography of the valley walls. However, for fine particulate matter (pm 2.5), no exceedances of the federal standards occur in King County. In addition, ozone is a standard that can be exceeded in Puget Sound on hot, sunny days during the summer. In 2006-2008 the Mud Mountain monitor in Enumclaw, King County violated the federal 8-hour ozone standard (Puget Sound Clean Air Agency, 2008). This monitoring station is located in a rural region, although the precursor chemicals that react with sunlight to produce ozone are generated primarily in large metropolitan areas. Ozone can typically be transported 10-30 miles downwind from the original source (Puget Sound Clean Air Agency, 2008).

Sound levels throughout the lower basin are variable depending on location, ranging from relatively loud noises associated with urban and industrial activities on the Duwamish River in the lower basin to very quiet rural environments in the upper basin. In portions of the lower basin, especially near industrial areas, sound levels could occasionally exceed noise standards under certain conditions. SR167 is next to the project site and contributes substantially to noise levels in the area.

Roads in the lower Green River basin include residential streets to interstate freeways. Traffic volumes vary accordingly from few, infrequent cars to several thousand per day on the interstates. Traffic near the project site could be considered heavy due to the proximity of SR167.

#### **4.14 Aesthetics**

Information characterizing visual quality and aesthetic resources within the Green/Duwamish River basin is described in detail in Section 3.13 of the FPEIS (USACE, Seattle District and King County DNR 2000).

The visual quality of the lower Green River basin varies with its diverse land use and development. Visual quality decreases downstream as development increases.

At Riverview Park, large, mature trees along the river banks provide some visual quality but the predominance of invasive blackberries under the trees and along the edges of the site greatly detracts from the aesthetics of the area. The regular mowing of the majority of the site inhibits the establishment of vegetation other than grass and weedy herbaceous species. The dominance of SR167 also impacts the site’s aesthetic qualities.

## **5.0 ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION**

City of Kent. This property has been vacant since the mid 1990s. The PAS found that there was no record or evidence of hazardous or toxic material in or around the project site that is expected to affect project activities.

#### **4.10 Native American Concerns**

~~The cultural and historic resources of the Green/Duwamish River basin are described in detail in Section 3.16 of the FPEIS (USACE, Seattle District and King County DNR, 2000).~~

The project area is within the usual and accustomed fishing area of the Muckleshoot Indian Tribe. The Muckleshoot tribe considers the fisheries resources of the Green River system to be an invaluable resource, and a primary goal of the tribe is to protect and restore each run of fish in its usual and accustomed fishing area.

#### **4.11 Land Use**

The historic and current land and shoreline use of the Green/Duwamish River basin are described in detail in Section 3.11 of the FPEIS (USACE, Seattle District and King County DNR 2000).

Land use in the middle and lower Green River basin is highly urbanized. Historically agricultural and forested lands, the middle reaches of the Green River Basin are currently rapidly developing into suburban residential centers. In the lower portions of the Green River, industrial, residential, commercial land uses dominate near the river.

The project site is located along SR167 in the central part of the City of Kent. It is one of the last undeveloped parcels of land in the area.

#### **4.12 Recreation**

The historic and current land and shoreline use of the Green/Duwamish River basin are described in detail in Section 3.12 of the FPEIS (USACE, Seattle District and King County DNR 2000).

Riverview Park is currently an undeveloped and mowed field, likely used for dog walking and other passive recreation. No formal facilities exist on the site. The Green River Trail is adjacent to the park along Hawley Road on the eastern side of the property. Access to the Green River from Riverview Park is restricted due to steepness of the slope and the overgrowth of blackberries.

#### **4.13 Air Quality, Noise and Transportation**

Information characterizing the air quality, noise and transportation levels within the Green/Duwamish River basin is described in detail in Sections 3.8 and 3.9 of the FPEIS (USACE, Seattle District and King County DNR 2000).

In general, air quality in the Puget Sound region is considered to be good. Areas where pollutants originate from are mostly urban where there is a high density of cars, residences, and industry. Sources of these pollutants include car and truck exhaust and smoke from

The effects of the two proposed actions: 1) Construct the Flow Through Side Channel with a Vehicle Bridge (preferred alternative), and 2) Construct the Dead End Channel are compared to the baseline conditions associated with the no-action alternative and discussed below.

## **5.1 Topography, Geology, and Soils**

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### **5.1.1. NO ACTION ALTERNATIVE**

Under this alternative, there would be no changes to the topography, geology or soils in Riverview Park.

### **5.1.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE**

Information describing the environmental effects on the topography, geology, and soils of the Green/Duwamish River basin is presented in Section 4.4.1 of the FPEIS (USACE and King County DNR 2000). A discussion of site-specific information relevant to the proposed restoration project site is presented below.

The construction of the flow through side channel would require substantial excavation along the complete alignment to establish the proposed 24-foot depth. It is currently estimated that 60,000 cubic yards (cy) of native material would be removed to construct the channel. The majority of this material would be used on site to the east of the channel to form large berms and temporary sediment ponds. The grade of the existing landscape would be increased by 5 to 8 feet to provide a barrier between the newly constructed side channel and SR167.

Disturbance from construction would be short-term and temporary. The proposed project would change the topography of the site as discussed above. No changes to the geology or soils at the site are anticipated, with the exception of the addition of topsoil to the site if necessary to facilitate planting and channel bio-engineering. Topsoil removed during construction would be stockpiled onsite and reused to the extent possible. No substantial long-term increase in erosion or soil instability would occur. There would be a pulse of sedimentation following the opening of the channel to the mainstem Green River, resulting in short term turbidity increases as the channel adjusts to the new flow, and localized shifting of sediments would continue sporadically as the new channel becomes established. High flows during the winter and spring following construction would continue to mobilize sediments in the project area, potentially contributing to small increases in turbidity over that normally seen during high flow events. Potential short-term disturbance of surface sediments would be mitigated to a level of insignificance by control measures such as mechanical retardation, runoff control, sediment basins, and re-vegetation.

### **5.1.3 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE**

The construction of the dead end side channel would also require substantial excavation along the complete alignment, but to a lesser degree than the flow through channel. The majority of this material would likely be used on site to the east of the channel to form large berms and temporary sediment ponds.

Both short-term and long-term impacts would be similar to that of the flow through channel. The proposed project would change the topography of the site. No changes to the geology or soils at the site are anticipated, with the exception of the addition of topsoil to the site if necessary to facilitate planting and channel bio-engineering. ~~Topsoil removed during construction would be stockpiled onsite and reused to the~~ extent possible. No substantial long-term increase in erosion or soil instability would occur, however, due to the nature of the sediment load in the lower Green River, the dead end channel is expected to fill in within five to ten years following construction.

## 5.2 Hydrology

### 5.2.1. NO ACTION ALTERNATIVE

Under this alternative, there would be no changes to the hydrology in or adjacent to Riverview Park.

### 5.2.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE

Information describing the environmental effects on the water resources of the Green/Duwamish River basin is presented in Section 4.5 of the FPEIS (USACE and King County DNR 2000). A discussion of site-specific information relevant to the proposed restoration project site is presented below.

The hydraulic effects of the project on the portion of the Green River main stem parallel to the side channel were simulated using the Corps' HEC-RAS River Analysis System computer model. The simulations found little or no change to the existing (no action) average channel flow conditions during the median annual flow event (approximately 1000cfs). During larger events (OHW events of 6000cfs and higher), the preferred project alternative generated small reductions in the calculated water depth (on the order of 0.1 ft) and velocity (on order of 0.5 ft/sec) when compared to the no-action alternative. The exception was a minor increase in water surface elevation on the Green River just upstream of the proposed side channel outlet under the proposed condition. This 0.14 ft increase in water surface was localized, and corresponded to approximately a 3-foot increase in the water surface top width at this location. This phenomenon is likely due to the energy loss at the junction of the side channel outlet with the Green River main stem.

It is expected there would be some hyporheic flow of groundwater into the channel. The designed elevation of the channel bottom is below the groundwater table by approximately two feet as identified by geotechnical explorations performed in November 2009. Paired with the highly permeable soils on site, this seems to indicate that some hyporheic flow would be available to supplement the surface flow in the channel. The Corps has not quantified the magnitude of groundwater input, however.

### 5.2.3 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE

The dead end channel was analyzed qualitatively based on site specific physical characteristics and available hydraulic modeling. The dead end channel is represented by the no action alternative. This was done by carving out an area in one of the existing model cross sections, and marking it as ineffective flow - that is, an area with ~~no down river velocity. It was estimated that there would be no perceptible effect of~~ the dead-end channel on the river model. In addition, this kind of backwater area will result in deposition of suspended sand and silt, with no chance of future mobilization.

## 5.3 Water Quality

Information describing the environmental effects on the water quality of the Green/Duwamish River basin is presented in Section 4.6 of the FPEIS (USACE and King County DNR 2000). A synopsis of site-specific information relevant to the proposed restoration project site is presented below. A 404(b)(1) analysis is attached in Appendix B and a 401 water quality certification was received from the Washington Department of Ecology on 10 May 2010.

### 5.3.1. DESIGNATED USES

#### 5.3.1.1. *No Action Alternative*

Designated uses of the Green River would not be affected by this alternative.

#### 5.3.1.2. *Construct the Flow Through Side Channel – Vehicle Bridge Alternative*

The designated uses of “salmonid spawning and rearing,” “wildlife habitat,” and “aesthetics” would be augmented by the construction of the side channel and the increased habitat that is created. No additional designated uses are anticipated to be affected by the project.

#### 5.3.1.3 *Construct the Dead-End Channel Alternative*

The designated uses of “salmonid spawning and rearing,” “wildlife habitat,” and “aesthetics” would be augmented by the construction of the side channel and the increased habitat that is created, however, over time the channel would fill in with sediment and no longer function for salmonids spawning and rearing use. No additional designated uses are anticipated to be affected by the project.

### 5.3.2. TEMPERATURE

#### 5.3.2.1. *No Action Alternative*

Temperature in the Green River would not be affected by this alternative.

#### 5.3.2.2. *Construct the Flow Through Side Channel – Vehicle Bridge Alternative*

The elevation of the bottom of the proposed side channel would be below the observed groundwater elevation. While the groundwater table elevation may vary with season and flows of the adjacent Green River, it is anticipated that the

side channel would receive groundwater flow for the majority of the year. As groundwater is of a lower temperature than that of surface water, it can be expected that temperatures within the proposed side channel, as well as those in the adjacent Green River mainstem, would exhibit minor reductions in temperature due to the project.

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#### *5.3.2.3 Construct the Dead End Channel Alternative*

It is likely that a dead end channel would also received some groundwater flow during the majority of the year. However, it expected that temperatures would be higher in the dead end channel than the flow through due to lack of flushing and temporal decreases in depth due to sedimentation. During low flows, water in the dead end channel could become stagnant leading to temperatures that exceed the tolerance levels of juvenile salmonids.

### 5.3.3. NUTRIENTS AND DISSOLVED OXYGEN

#### *5.3.3.1. No Action Alternative*

Nutrients and DO would not be affected by this alternative.

#### *5.3.3.2. Construct the Flow Through Side Channel – Vehicle Bridge Alternative*

Nutrients and DO levels are not expected to change significantly due to the proposed project, but, in the immediate vicinity, cooler water temperatures in the side channel may lead to slight increases in DO levels.

#### *5.3.3.3 Construct the Dead End Channel Alternative*

There would be a lack of flushing, a potential for elevated temperatures, and temporal decreases in depth in the dead-end channel. This could potentially lead to algal blooms that cause high nutrient levels and low DO.

### 5.3.4. FECAL COLIFORM

#### *5.3.4.1. No Action Alternative*

Fecal coliform levels would not be affected by this alternative.

#### *5.3.4.2. Construct the Flow Through Side Channel – Vehicle Bridge Alternative*

While human and dog use of the site may increase after construction due to public interest in the new channel and associated bridge, it is not expected that this increased use would be great enough to result in an increase in fecal coliform rates in this reach of the river.

#### *5.3.4.3 Construct the Dead End Channel Alternative*

Impacts on fecal coliform levels from the dead end channel are expected to be similar to those of the flow through channel. There is a chance that fecal

coliform in the flow through channel could be slightly higher due to a lack of flushing.

### 5.3.5. TURBIDITY AND SUSPENDED SEDIMENTS

#### 5.3.5.1. *No Action Alternative*

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Under this alternative, there would be no effects to turbidity or suspended sediment levels.

#### 5.3.5.2. *Construct the Side Channel – Vehicle Bridge Alternative*

Construction of the inlet/outlet and re-watering of the channel may cause short-term increases in turbidity. These increases are attributable to the excavation of the side channel inlet and outlets, placement of rock, LWD and other materials, and re-watering and stabilization of the new channel. Heavy equipment needed to perform in-stream work would be staged in upland areas and would not enter the river bed. All in-water work would be conducted during the prescribed work windows and during low flow to minimize water quality impacts. The projects would use Best Management Practices (BMPs) to ensure state water quality standards are maintained. Daily water quality monitoring would be conducted during in-water work at a compliance point on the Green River located 300 feet downstream of the construction site to ensure compliance with these standards: turbidity would not exceed 5 NTU over background when the background is 50 NTU or less; or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU . Should monitoring indicate that state water quality maximum standards for turbidity are exceeded; work would be halted and modified such that standards are met for the remainder of the project construction.

#### 5.3.5.3 *Construct the Dead End Channel Alternative*

Turbidity impacts of constructing the dead end channel inlet would be similar to those for the inlet and outlet construction of the flow through channel described above. The same best management practices and water quality monitoring would be implemented as those described for the flow through channel.

## 5.4 Vegetation and Wetlands

### 5.4.1. NO ACTION ALTERNATIVE

There would be no effect to existing vegetation under this alternative. Regular mowing and invasive species would continue to inhibit the growth of native plants on the site. Weedy species that are currently present on site may continue to spread, and eventually displace some of the native trees.

### 5.4.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE

Information describing the environmental effects on vegetation in the Green/Duwamish River basin is presented in Section 4.8 of the FPEIS (USACE and

King County DNR 2000). A discussion of site-specific information relevant to the proposed restoration project site is presented below.

The construction would avoid the existing trees and cottonwood grove to the extent that is practical. Clearing and removal of invasive species would occur around these trees and across the site as necessary. The removal of 13 trees of approximately 12 inch diameter would be required to construct the inlet and outlet of the channel. After establishment, the proposed new plantings would increase the vegetative cover of native species along the side channel and the Green River. This would result in increased riparian shading and cover leading to localized cooler temperatures, high flow refuge provided by low-hanging vegetation, and increased primary production in the form of insect and debris drop.

#### 5.4.6 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE

Impacts to vegetation would be similar to those described for the flow through channel, avoiding existing trees and clearing invasive vegetation. However, less trees would be required to be removed because only an inlet would need to be constructed. Riparian plantings similar to those described for the flow through channel are proposed for the dead end channel, and thus would have similar beneficial impacts.

### 5.5 Fishery Resources

Information describing the environmental effects on the fisheries resources of the Green/Duwamish River basin is presented in Section 4.7 of the FPEIS (USACE and King County DNR 2000). A discussion of site-specific information relevant to the proposed restoration project site is presented below.

#### 5.5.1. FISH HABITAT

##### 5.5.1.1. *No Action Alternative*

Under this alternative, there would be no effect to existing fish habitat. Currently, habitat conditions are limited by the existing levees and the extensive deterioration of the riparian corridor caused by development in the floodplain. Levees and the resulting development constrain the river to a single, fixed channel and lead to a reduction in shade, decreased water quality, and limit organic/nutrient input and LWD recruitment, elements which are essential in the formation of high-quality fish habitat.

##### 5.5.1.2. *Construct the Flow Through Side Channel – Vehicle Bridge Alternative*

The construction of the side channel would provide important off-channel refuge from high flows and increase the amount of available salmonid rearing habitat in the lower reaches of the Green River. Both of these elements are considered limiting factors for salmon recovery in the Green River (Kerwin 2000). Increased native overhanging vegetation and the introduction of LWD into the channel would provide additional high quality habitat to a variety of fish species. The presence of the vehicle bridge would have minimal impacts on the quality of the fish habitat since it would be wifespan and no portions of the abutments would be located within the channel.

### *5.5.1.3 Construct the Dead End Channel Alternative*

The construction of the dead end channel would initially provide off-channel refuge from high flows, however due to the nature of the sediment load in that reach of the Green River it is expected that the channel would fill in with sediment over time. ~~Summer low flow rearing habitat would be lost very shortly~~ after construction, since sediment deposition up to one foot has been observed following one flood event (Corum, USACE, pers. comm.). Therefore, the habitat benefits provided to fish are expected to diminish by as much as 90% within five to ten years.

## 5.5.2. FISH USE

### *5.5.2.1. No Action Alternative*

Under this alternative, no changes to fish use in the Green River would occur.

### *5.5.2.2. Construct the Flow Through Side Channel – Vehicle Bridge Alternative*

The construction of the side channel would provide valuable and scarce high flow refuge and juvenile rearing habitat in the lower Green River. It is anticipated that juvenile salmonids and other fish would utilize this new habitat during all seasons.

There would likely be short term turbidity increases in the mainstem of the Green River while the temporary coffer dams are installed and when the channel is re-watered. This may cause some fish to avoid the immediate project area during this period. This disturbance is expected to be minor and temporary, and BMPs would be in place to ensure water quality standards are met per the Water Quality Certification. Fish rescue would be performed during the installation of the coffer dams at both the inlet and outlet of the channel before dewatering takes place. Fish rescue is intended to have an overall neutral effect on fish populations, however, as with any fish sampling methodology, a small percentage may become too stressed to survive the rescue. National Marine Fisheries Service's protocol for dewatering and fish rescue would be strictly adhered to.

### *5.5.2.3 Construct the Dead End Channel Alternative*

The construction of the dead end channel would temporarily provide habitat for juvenile salmonids and other species of fish, however those benefits will diminish over time since the channel is expected to fill in with sediment within five to ten years post-construction.

Temporary impacts to turbidity due to the construction would be similar to those discussed for the flow through channel construction, although to a lesser extent since only an inlet would be constructed. Similar BMP's would be implemented to minimize impacts to fish.

## 5.6 Wildlife

### 5.6.1. NO ACTION ALTERNATIVE

Under this alternative, there would be no effects to wildlife.

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### 5.6.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE

#### ALTERNATIVE

Information describing the environmental effects on wildlife of the Green/Duwamish River basin is presented in Section 4.9 of the FPEIS (USACE and King County DNR 2000). A discussion of site-specific information relevant to the proposed restoration project site is presented below.

Wildlife that is foraging or resting in the vicinity of the project at the time of construction may be temporarily displaced due to the noise and movement of the machinery. However, these effects would be temporary and displaced animals would likely return to the area after construction is completed. Some small mammals (moles, voles, mice, etc.) would likely be killed by heavy equipment during construction.

As urban-adapted predators, bald eagles and other raptors that may be foraging over the area are unlikely to be affected by the construction activities as they forage for fish, birds and small mammals along the Green River. The majority of the existing trees would be preserved during construction and no breeding or nesting areas are expected to be directly impacted. Construction of the restoration site is not expected to result in a long-term reduction in the abundance or distribution of any prey items that local wildlife may be seeking. Planting native trees and shrubs along the channel and on the island would increase the extent and species diversity of vegetation on the restoration site. These plants would increase the habitat value of the site by creating additional opportunities for foraging, nesting, cover, and refuge for a wide variety of species.

### 5.6.3 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE

Temporary impacts to wildlife would be similar to those described for the flow through channel, but to a lesser extent due to less excavation being required. Beneficial impacts are also expected to be similar, however there would be less foraging opportunities for wildlife since the channel will likely fill in over time leading to a decline in fish habitat.

## 5.7 Threatened and Endangered Species

### 5.7.1. NO ACTION ALTERNATIVE

Under this alternative, the degraded condition of the lower Green River corridor would not be affected and the amount and quality of off-channel, juvenile rearing, and high flow refugia habitat, a limiting factor for salmon recovery in the Green River, would also be unaffected.

### 5.7.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE

#### ALTERNATIVE

Information describing the environmental effects on threatened and endangered fish species of the Green/Duwamish River basin is presented in Section 4.7.4 of the FPEIS (USACE and King County DNR 2000); the effects on threatened and endangered plant species is presented in Section 4.8.3 of the FPEIS and effects on threatened and endangered wildlife species is presented in Section 4.9.2 of the FPEIS (USACE and King County DNR 2000).

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One of the primary objectives of the proposed project is to create additional juvenile rearing habitat for Chinook salmon. The proposed channel has been designed using known habitat preferences for juvenile Chinook to ensure this objective is met. Upon completion, it is expected that the channel would be utilized both as juvenile rearing habitat and as high-flow refuge. Generally, steelhead utilize and prefer similar types of habitat as Chinook, and therefore, it can be assumed that steelhead would benefit from the project as well. Bull trout, while historically documented in the Green River and present in the Duwamish as indicated by recent records, are not known to occur near the project site. Only one bull trout has been recorded above the RM 7 since 1956 (Goetz, personal communication). If bull trout are present, the side channel would provide juvenile salmonid habitat, and therefore, increase prey resources for bull trout at the project site as well as downriver in the Duwamish Estuary where most recent bull trout observations have occurred.

Construction of the inlet and outlet would likely cause temporary disturbances to Chinook salmon, steelhead and bull trout due to increased noise and/or elevated turbidity levels, if fish are present during construction. Adult fish are expected to avoid the construction area and still be able to access upstream spawning areas. The work to connect the side channel to the mainstem of the Green River would be performed between 1 August and 31 August, before spawners are likely to arrive, and after fry have departed to minimize this disturbance.

The effect determinations made in the Programmatic Biological Assessments for FPEIS, including this project, are listed in Table 1. The USFWS concurred with the determination of “may affect, but not likely to adversely affect” for the bald eagle, marbled murrelet, northern spotted owl, gray wolf, Canada lynx, and bull trout in relation to the Riverview Park project as originally authorized in the Green Duwamish Ecosystem Restoration Project via a concurrence letter dated 27 March 2001 (Appendix D). Similarly, NMFS concurred with the determination of “may affect, but not likely to adversely affect” for Puget Sound Chinook salmon via a concurrence letter dated 10 April 2001 (Appendix D).

No critical habitat is designated for marbled murrelet or northern spotted owl in the project area or in areas downstream. Therefore, “no effect” is anticipated for marbled murrelet and northern spotted owl critical habitat.

**Table 1: 2001 Programmatic Threatened and Endangered Species Effect Determination Summary**

Species	Listing Status	Critical Habitat	Programmatic Effects Determination	Programmatic Services Concurrence
Bald Eagle	Delisted		Not likely to adversely affect	Yes
<i>Haliaeetus leucocephalus</i>				
Marbled Murrelet	Threatened	Designated	Not likely to adversely affect species or critical habitat	Yes
<i>Brachyramphus marmoratus</i>				
Northern Spotted Owl	Threatened	Designated	Not likely to adversely affect species or critical habitat	Yes
<i>Strix occidentalis caurina</i>				
Gray Wolf	Threatened	—	Not likely to adversely affect	Yes
<i>Canis lupus</i>				
Canada Lynx	Threatened	—	Not likely to adversely affect	Yes
<i>Lynx Canadensis</i>				
Coastal/Puget Sound Bull Trout	Threatened	Designated	Not likely to adversely affect	Not included in consultation
<i>Salvelinus confluentus</i>				
Puget Sound Chinook Salmon	Threatened	Designated	Not likely to adversely affect species or critical habitat	Not included in consultation
<i>Oncorhynchus tshawytscha</i>				

Consultation was reinitiated for Puget Sound steelhead, and Chinook salmon and bull trout critical habitat in February 2010 with NMFS and USFWS, respectively, for the current design of the side-channel at Riverview Park. The Corps determined this project **may affect, but is not likely to adversely affect** steelhead or Chinook and bull trout critical habitat. Concurrence with this determination was received from NMFS on 8 April 2010 regarding Chinook critical habitat and steelhead,, and from USFWS on 14 April 2010 regarding bull trout critical habitat.

Since all in-water work would take place during the designated fish window (August 1 to August 31), project construction should largely avoid impacts to Chinook and bull trout. However, steelhead are present in the river year round at all life stages so caution would have to be utilized to not cause them harm. This would be done by following NMFS recommended protocol for dewatering and fish rescue. If steelhead are present, extra care would be taken to minimize stress, and they would be released immediately after capture.

### 5.7.3 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE

Temporary impacts from construction to Chinook salmon, steelhead, and bull trout are expected to be similar to those described for the flow through channel, but to a lesser extent since only an inlet would be constructed. Similar best management practices, including completing in-water work within the fish window, installing a cofferdam, and following NMFS's protocol for dewatering and fish rescue would be implemented to minimize these impacts.

The construction of the dead end channel would initially provide off-channel refuge from high flows for juvenile Chinook salmon and steelhead. However, due to the nature of that reach of the Green River the channel would fill in with sediment over time. Summer low flow rearing habitat would be lost shortly after construction since

sediment deposition up to one foot has been observed following just one flood event (Corum, USACE, pers. comm.). Therefore, the habitat benefits provided to Chinook and steelhead are expected to diminish by as much as 90% within five to ten years.

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## **5.8 Cultural Resources**

### **5.8.1. NO ACTION ALTERNATIVE**

No disturbance to any possible cultural and historic resources would occur under this alternative.

### **5.8.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE**

Information describing the effects on cultural and historic resources of the Green/Duwamish River basin is presented in Section 4.18 of the FPEIS (USACE and King County DNR 2000).

Professional cultural resources studies have been conducted for the proposed project. These studies have defined the Area of Potential Effect (APE) as the immediate project area where ground disturbing activities would occur. While an archaeological investigation did not identify any cultural resources within the APE, archaeological monitoring would be required for all ground disturbing activities, due to the potential for deeply buried artifacts. If historic properties eligible for the National Register of Historic Places are found to be present in the project area, a programmatic agreement for data recovery (if necessary) would be developed in consultation with the Muckleshoot Tribe Preservation/Cultural Resources Division and the DAHP that describes specific measures that would be taken to mitigate adverse effects resulting from the project. These contingencies have been factored into the overall cost of the project. On 10 May 2010 concurrence of “No historic properties affected” was received from the Washington State Historic Preservation Officer (SHPO) (Appendix F). A request for knowledge and concerns letter was sent to the Muckleshoot Indian Tribe Preservation/Cultural Resources Division on 12 February 2010 (Appendix F). No response was been received from the Tribe to date.

### **5.8.3 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE**

Impacts to cultural resources would be the same as those described for the flow through channel. Similar monitoring and consultation would be required for ground disturbing activities.

## **5.9 Hazardous and Toxic Materials**

### **5.9.1. NO ACTION ALTERNATIVE**

Under this alternative there would be no changes to the site that would affect hazardous and toxic materials.

### **5.9.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE**

Information describing the environmental effects on hazardous and toxic materials of the Green/Duwamish River basin is presented in Section 4.4.2 of the FPEIS (USACE and King County DNR 2000). A synopsis of site-specific information relevant to the proposed restoration project site is presented below.

During construction and installation activities, fuels, oils, lubricants, and other hazardous materials would be used. An accidental release or spill of any of these substances could occur. A spill could result in potentially adverse impacts to on-site soils. However, the amounts of fuel and other lubricants and oils would be limited, and the equipment needed to quickly limit any contamination would be located on site.

To minimize the likelihood of potential spills and leaks of petroleum and hydraulic fluids during project construction, construction equipment would be inspected daily for leaks and petroleum contamination. Additionally, a spill prevention control and containment plan designed to reduce impacts from spills (fuel, hydraulic fluid, etc.) would be in place prior to the start of construction. The project would not introduce any hazardous materials to the project areas.

#### 5.9.3 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE

Impacts from construction on hazardous and toxic materials would be similar to those described for the flow through channel. Similar best management practices would be implemented so no fuels, oils, lubricants or other hazardous materials are released to the site.

### 5.10 Native American Concerns

#### 5.10.1. NO ACTION ALTERNATIVE

There would be no change in Native American concerns for the site.

#### 5.10.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE

Information describing the effects on cultural and historic resources, including Native American concerns, of the Green/Duwamish River basin is presented in Section 4.18 of the FPEIS (USACE and King County DNR 2000). A synopsis of site-specific information relevant to the proposed restoration project site is presented below.

The project would improve habitat available to salmon in the Green River by improving the quality of rearing and refugia habitat available to this important resource for Native American Tribes in the area. During project design, the Corps coordinated with the Muckleshoot Indian Tribe Fisheries Division and, to the extent possible, incorporated tribal concerns into the site design. Construction timing of the project should avoid impacts to both out-migrating juvenile salmonids and adults moving upstream to spawn so it would not affect tribal fishing along the Green River. However, construction at the site would restrict tribal member's access to fishing in the immediate area of the project. The Corps will notify and coordinate with the Tribe

to prior to construction and will take measures to avoid and minimize adverse effects to tribal fishing near the construction site.

#### 5.10.3 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE

Impacts to Native American Tribal Fisheries for the dead end channel would be ~~similar to those described for the flow through channel. Best management practices~~ described above would be implemented to minimize impacts to fisheries, and the Muckleshoot Tribe would be coordinated with prior to construction. In the long term, the dead end channel would be less beneficial to Tribal fisheries due to the expected loss in functionality as salmon habitat over time caused by sedimentation.

### 5.11 Land Use

#### 5.11.1. NO ACTION ALTERNATIVE

Currently Riverview Park is open space, used primarily for passive recreation. The City of Kent has, in the past, planned to develop the site as a more formal park with features to include restrooms, picnic shelters, parking lots, and a hand-carry boat ramp. The City formally requested permits for this work in 2007-2008 from the appropriate resource agencies. This process was halted in 2008 due to lack of funding. If the side channel project is not built, the City of Kent could still move forward with the proposed formal park if funding becomes available, but this park would not include a side channel.

#### 5.11.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE

Information describing the environmental effects on land and shoreline use in the Green/Duwamish River basin is presented in Section 4.13 of the FPEIS (USACE and King County DNR 2000). A discussion of site-specific information relevant to the proposed restoration project site is presented below.

Land use in the project area would not change appreciably from the construction of the side channel. An island would be created with the excavation of the side channel and a vehicle bridge would be constructed to facilitate access and maintenance to this island. As mentioned above, the City of Kent's proposed formal Riverside Park plan could be implemented in the future if funding becomes available.

#### 5.11.3 CONSTRUCTION THE DEAD END CHANNEL ALTERNATIVE

Land use in the project area following construction would not change much beyond the no action alternative as the project is located in a City of Kent park. If the City moves forward with plans to further develop the park, it could be used for more active recreation.

### 5.12 Recreation

#### 5.12.1. NO ACTION ALTERNATIVE

Under this alternative, no changes in recreation would occur at the site by Corps construction. However, the City of Kent could move forward with formal park

development, which would greatly alter recreational uses of the site, without the Corps side channel project.

#### 5.12.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE

Information describing the environmental effects on recreation in the ~~Green/Duwamish River basin is presented in Section 4.14 of the FPEIS (USACE and King County DNR 2000).~~ A discussion of site-specific information relevant to the proposed restoration project site is presented below.

The installation of the side channel and bridge may result in increased interest in the site and therefore recreational use, including fishing (both legal and illegal). Access to the site by the public, including dogs, could cause potential disturbance to adult and juvenile salmon. However, the City of Kent plans to put up educational signage to encourage conservation, and dense plantings should discourage access to the channel. The City of Kent has plans to reroute the existing Green River Trail away from Hawley Road, likely through the open space of the park. This may also increase recreational use in the area.

#### 5.12.3 CONSTRUCTION THE DEAD END CHANNEL ALTERNATIVE

Recreation in the project area following construction would be similar to the description in the flow through channel alternative. If the City moves forward with plans to further develop the park, it could be used for more active recreation.

### 5.13 Air Quality, Noise and Transportation

#### 5.13.1. NO ACTION ALTERNATIVE

Under this alternative, no changes in air quality, noise, or transportation would occur on site.

#### 5.13.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE

Information describing the environmental effects on air quality, noise, and transportation in the Green/Duwamish River basin is presented in Sections 4.10 and 4.11, respectively, of the FPEIS (USACE and King County DNR 2000). A discussion of site-specific information relevant to the proposed restoration project site is presented below.

Construction vehicles may temporarily increase air emissions and noise in the immediate project vicinity. Noise associated with the use of heavy machinery may disturb recreational users of the Green River Trail, although the site's proximity to SR167 makes this unlikely as it is already an area with high noise levels. Construction would comply with the City of Kent ordinances for noise. These effects would be temporary and highly localized, and would not result in significant impacts. These emissions would not exceed EPA's *de minimis* threshold levels (100 tons/year for carbon monoxide and 50 tons/year for ozone) or affect the implementation of Washington's Clean Air Act implementation plan.

For every gallon of diesel fuel burned, 22 pounds of CO<sub>2</sub> are produced, and every gallon of gasoline produces 19.4 pounds of CO<sub>2</sub> (USEPA, 2008). Based on the amount of equipment needed for construction, including but not limited to bulldozers, front end loaders, dump trucks, cranes, and excavators, operating varying hours an estimated 1352 tons of CO<sub>2</sub> would be emitted using a roadway construction emissions spreadsheet model for non-road equipment (SMAQMD 2008). Also calculated for non-road construction equipment are carbon monoxide (CO), volatile organic carbons (VOCs), nitrogen oxides (NO<sub>x</sub>), particulate matter (PM), and sulfur oxides (SO<sub>x</sub>). In addition, loaded dump trucks that might get five miles per gallon of diesel would be required to bring 844 cubic yards of material to the site. In addition to diesel use, there would be gasoline consumed in transporting Corps and construction personnel to the site. Table 2 outlines assumed emissions based on USEPA (2008) and SMAQMD (2008). Emissions from construction equipment would not exceed EPA's *de minimis* threshold or affect the implementation of Washington's Clean Air Act implementation plan. The CO<sub>2</sub> emissions listed below may seem insignificant compared to the gigatons emitted per year globally (Raupach et. al., 2007). Nevertheless, diesel fuel consumption by heavy machinery required for construction, material haul-off, and gasoline consumption for travel to the sites for all Corps projects, including this project, are a part of world-wide cumulative contributions to change in climate by way of increases in greenhouse gas emission. However, the extensive plantings at the site should aid in the absorption of CO<sub>2</sub> over time.

**Table 2. Estimated emission (tons) of air pollutants and green house gases from operation of vehicles and construction equipment for Riverview Park Restoration**

	tons CO	tons VOC	Tons CO <sub>2</sub>	tons NO <sub>x</sub>	tons PM	tons SO <sub>x</sub>
Truck Emissions *			6.74			
Non Road Emissions **	2.58	1.55	1352.4	17.95	0.68	0
Personal Vehicle Emissions ***	77.00		77.00			

\* Assumes 5 mpg gasoline, 84.4 trips, 40 miles round trip; modeling data not available for pollutants other than CO<sub>2</sub>

\*\*Construction equipment; based on spreadsheet model from SMAQMD (2008); assumes 500-hp diesel engines working 8 hrs per day, modeling data.

\*\*\* Assumes 20 mpg gasoline, 5 vehicles for 175 days of construction, 20 miles round trip; data not available for pollutants other than CO<sub>2</sub>

Noise on the site after construction may be reduced by the creation of berms and hills to the east of the side channel. These landscape features would serve as a sound barrier to protect the channel and island from the traffic noise of SR167.

The traffic route for construction would likely come from SR167, then turning south onto Washington Avenue and then east onto Hawley Road. Construction vehicles would temporarily increase the volume and disrupt traffic in the immediate project vicinity, especially Hawley Road, during construction of the site as vehicles access and depart the construction site. This disruption would mostly arise from bringing in 844 cubic yards of topsoil. This would require dump trucks making multiple daily

round trips to the site over the course of 2 to 3 weeks. This, along with construction equipment entering and exiting the site, would cause an increase in congestion during peak commuting hours, although no road closures are expected. Parking of construction staff should not result in any issues for local residents since the site is located in a park and there are no residences or businesses in the immediate vicinity. All these impacts would be temporary and highly localized, and are not expected to be significant. To minimize traffic impacts, a traffic control plan would be developed and implemented.

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#### 5.13.3 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE

Impacts to air quality, noise, and transportation are expected to be similar to those described for the flow through channel, although to a lesser extent since construction should be shorter in duration due to less material needing to be excavated.

### 5.14 Aesthetics

#### 5.14.1. NO ACTION ALTERNATIVE

Under this alternative, no changes to aesthetics are anticipated to occur on the site as a result of Corps construction. If the City of Kent proceeds with formal development of the park, the aesthetics of the area would be changed significantly.

#### 5.14.2. CONSTRUCT THE FLOW THROUGH SIDE CHANNEL – VEHICLE BRIDGE ALTERNATIVE

Information describing the environmental effects on visual quality and aesthetic resources of the Green/Duwamish River basin is presented in Section 4.15 of the FPEIS (USACE and King County DNR 2000). A discussion of site-specific information relevant to the proposed restoration project site is presented below.

Removing invasive species and planting native vegetation along the newly created side channel and on the island would greatly improve the visual and aesthetic appeal of the site. This improvement would be somewhat compromised by the construction of the vehicle bridge for access to the island. The proposed fill added to the east side of the site to create berms and hills would serve as a visual barrier to SR167 from the park and thus increase visual value.

During excavation and construction of the site, the aesthetic quality of the general area could be reduced due to the noise and air emissions generated by the construction equipment, which may disturb recreational users of the Green River Trail. However, these impacts would be temporary and highly localized, and are not expected to result in significant impacts.

#### 5.14.3 CONSTRUCT THE DEAD END CHANNEL ALTERNATIVE

Impacts to aesthetics are expected to be similar to those described for the flow through channel. However, the dead end channel would be more aesthetically pleasing as there

is no bridge proposed for this alternative and the site would maintain more natural scenery.

## **6.0 UNAVOIDABLE ADVERSE EFFECTS**

Unavoidable adverse effects of the proposed project include:

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- (1) Noise disturbance to wildlife, homeowners, and recreational users in the vicinity of operating heavy machinery during excavation and construction of the side channel. Most wildlife species are anticipated to avoid the area while work is in progress. However, it is likely that some small mammals (moles, mice, voles, etc.) would be killed by equipment during construction. To reduce impacts to humans, work would be conducted only during daylight hours in accordance to local noise ordinances.
  - (2) Disruption of local traffic in the project vicinity would occur during construction. Proper signage and flaggers would be utilized as necessary to address safety concerns and move traffic through the area as quickly as possible.
  - (3) Mortality of some trees and shrubs would occur within the project site. The project has been designed to avoid native trees to the extent possible, but some trees would have to be removed. New native plantings onsite would compensate for this impact.
  - (4) Temporary and localized adverse impacts to water quality would occur during inlet/outlet construction and side channel rewatering.
  - (5) Human use of the site (fishing, dog walking) may increase after project completion due to the construction of the bridge. Bollards would be installed on the bridge to restrict access to only authorized vehicles, but pedestrian usage is likely. Ideally, human activity around a restoration site is minimized to ensure the target species can fully utilize the area as intended.
  - (6) The conversion of 16,000 square feet of land to open water.

Given the temporary, localized, necessary, and minor nature of these effects, the Corps has determined that the proposed restoration project would not result in significant adverse environmental impacts.

## **7.0 AVOIDANCE AND MINIMIZATION OF EFFECTS**

Adverse impacts would be avoided and minimized by using Best Management Practices (BMPs). For the side channel construction project these would include:

- All stockpiled materials would be protected against surface run-off using measures such as erosion control blankets, plastic sheeting, and perimeter silt fencing.
- Four de-siltation basins/sediments traps would be located onsite to handle surface water runoff and to treat dewatering water.

- A Stormwater Water Pollution and Prevention Plan (SWPPP) would be submitted by the contractor to ensure erosion control measures are followed.
- Connecting the newly excavated side channel with the mainstem of the Green River during the established in-water work window (August 1 to August 31)
- During inlet/outlet construction and rewatering of the side channel, appropriate turbidity control methods (temporary coffer dam, silt curtains, or similar) would be used to isolate construction from the Green River and minimize turbidity impacts.
- All required de-watering activities during construction would use appropriate devices (i.e. pumps, sand bags, sumps). All water removed from the site would be discharged in a vegetated upland location, de-siltation basin, or location that would not incur damage due to the water discharge.
- Water quality sampling would be conducted according to the protocol approved by the Washington Department of Ecology for the following parameters: turbidity, dissolved oxygen, and pH. Construction could be halted if deemed necessary under the water quality sampling plan in compliance with the Water Quality Certification.
- Drive trains of equipment would not operate in the water.
- All equipment would be cleaned prior to in-water construction work.
- Biodegradable hydraulic fluids would be used in machinery.
- No refueling would occur near the shoreline of the Green River or the side channel. All refueling would occur in the staging area located on the far eastern side of the site.
- Construction equipment shall be regularly checked for drips or leaks.
- At least two fuel spill kits with absorbent pads would be onsite at all times.
- During fish rescue, NMFS guidelines for dewatering and fish rescue would be strictly adhered to.
- Tree removal will occur prior to April 1 in the construction year to minimize disturbance to nesting birds.

## 8.0 CUMULATIVE IMPACTS

Cumulative impacts are those changes to the physical, biological, and socioeconomic environments, which would result from the effects of a proposed action when added to other past, ongoing, and reasonably foreseeable actions, regardless of what agency of government or person undertakes such other actions. As such, they include the impacts of this restoration project considered in conjunction with current and future projects constructed or planned within the lower Green/Duwamish River watershed.

Multiple restoration projects are ongoing in the Green River watershed, both associated with the Corps and the Green-Duwamish ERP and not. Specifically, other ERP project proposed for implementation in the near future include: Upper Springbrook Creek Restoration in Renton, Big Spring Creek Restoration in Enumclaw, Meridian Creek Outlet and Wetland Restoration in Kent, and Mill Creek Wetland Restoration in Auburn, to name a few. In addition, other ERP restorations have been completed in recent past (i.e., Site 1 Estuarine Restoration and Meridian Valley Creek Realignment). Additional projects not associated with the ERP are planned or on-going in the Green-Duwamish watershed and include invasive species removal, gravel nourishment, removal of fish barriers or culvert replacements, levee realignment, limiting livestock access to creeks, and public outreach

efforts to educate the public about land use impacts, etc. All of these efforts would result in long-term, cumulative benefits to the amount and functional value of restored habitat, improvements in the overall watershed condition, and would ultimately increase the ability of the watershed to support critical life history stages of native fish and wildlife populations. Other less beneficial activities in the watershed include ongoing levee and dam repairs and continued adverse land use practices, all of which perpetuate the degraded condition of the Green River.

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If the City of Kent reinitiates the proposal for developing a formal park at the site, impacts to the Corps project may occur. The City park plan includes parking lots, restrooms facilities, picnic shelters, boat launches and other recreational features. Increased active human use of the park is not necessarily compatible with a restoration site and efforts would need to be made to assure that the formal park, and its associated recreation, does not have negative impacts on the function of the side channel and associated riparian plantings.

The negative environmental effects of the Riverview Park Side Channel construction are temporary or minor and are associated primarily with the actual construction of the project, mainly the rewatering of the side channel as it is joined with the Green River. The combination of mitigation measures and BMPs reduce the cumulative, short-term (i.e. construction related) impacts of these projects to an insignificant level. More importantly, the beneficial effects generated by the project compensate for these short-term negative effects. Thus, the proposed restoration project would contribute to beneficial cumulative effects within the watershed from restoration activities and would help to incrementally offset adverse impacts on habitats from past, present, and future redevelopment projects along the Green River.

## **9.0 COORDINATION**

Development and design of this project has been coordinated with involvement by the following agencies and entities:

- State of Washington Department of Fish and Wildlife (WDFW)
- U.S. Fish and Wildlife Service (USFWS)
- National Marine Fisheries Service (NMFS)
- Washington Department of Ecology (Ecology)
- Washington Department of Natural Resources (WDNR)
- Washington State Historic Preservation Office (SHPO)
- Muckleshoot Indian Tribe
- City of Kent, King County, Washington
- Sacramento District Corps (Agency Technical Review)

A public comment period was held from 19 April 2010 to 20 May 2010. Comments received and the specific Corps responses to these comments can be found in Appendix H.

## **10.0 ENVIRONMENTAL COMPLIANCE**

### **10.1 National Environmental Policy Act**

As required by NEPA, this EA describes existing environmental conditions at the project site, the proposed action and alternatives, potential environmental impacts of the proposed project, and mitigation measures to minimize environmental impacts. The Corps invited submission of factual comment on the environmental impact of the proposed project. Comments were considered in determining whether it would be in the best public interest to proceed with the proposed project. ~~The Corps considered all submissions received before the expiration date of the public notice that accompanied the draft environmental assessment.~~ Based on the analysis in the EA and the comments received, the Corps has determined that a Finding of No Significant Impact (FONSI) is appropriate.

### **10.2 Endangered Species Act of 1973 as amended (PL 93-205)**

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must identify and evaluate any threatened and endangered species, and their critical habitat, that may be affected by an action proposed by that agency. A Biological Assessment was prepared for the Green–Duwamish ERP in association with the FPEIS which assessed potential effects to listed species from the proposed projects. The BA determined that the proposed work was not likely to adversely affect endangered or threatened species or their critical habitats designated under the Act. The USFWS concurred with the determination for the bald eagle, marbled murrelet, northern spotted owl, gray wolf, Canada lynx, and bull trout in relation to the Riverview Park project as originally authorized in the Green Duwamish Ecosystem Restoration Project via a concurrence letter dated 27 March 2001. Similarly, NMFS concurred with the determination for Puget Sound Chinook salmon via a concurrence letter dated 10 April 2001 (Appendix D).

Supplemental consultation for newly listed species and critical habitat was initiated with the Services for the proposed Riverview Park project. The Corps' evaluation determined that the proposed action **may, affect but is not likely to adversely affect** threatened and endangered species and their designated critical habitat. Concurrence with this determination was received from NMFS on 8 April 2010 regarding Chinook critical habitat and steelhead, and from USFWS on 14 April 2010 regarding bull trout critical habitat.

See Appendix D for copies of all concurrence letters.

### **10.3 Clean Water Act**

Section 404 of the Clean Water Act authorized a permit program for the disposal of dredged or fill material into waters of the United States, and defined conditions which must be met by Federal projects before they may make such discharges. The Corps of Engineers retains primary responsibility for this permit program. The Corps does not issue itself a permit under the program it administers, but rather demonstrates compliance with the substantive requirements of the Act through preparation of a 404(b)(1) evaluation.

The Corps prepared a 404(b)(1) evaluation to document findings regarding this project pursuant to Section 404 of the Act (Appendix B).

Section 401 of the Clean Water Act requires federal agencies to comply with EPA, state, or tribal water quality standards. EPA has delegated Section 401 certification to the Washington Department of Ecology. This work requires a water quality certification from the Washington Department of Ecology for compliance with Section 401 of the Clean Water Act for work below the Ordinary High Water (OHW) line. On 10 May 2010, the Corps received a 401 certification under the conditions of a Nationwide Permit 27 from the Washington Department of Ecology (Appendix G).

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Section 402 of the Act requires a National Pollutant Discharge Elimination System (NPDES) permit and the associated implementing regulations for General Permit for Discharges from Large and Small Construction Activities for construction disturbance over one acre. This project would have land disturbance of over one acre and therefore a NPDES permit would be obtained by the contractor and they would prepare and implement a Stormwater Pollution Prevention Plan.

#### **10.4 Rivers and Harbors Act of 1899**

The Rivers and Harbors Act of 1899 regulates structures or work in or affecting navigable waters of the United States including discharges of dredged or fill material into waters of the United States. Structures include without limitation, any pier, boat dock, weir, revetment, artificial islands, piling, aid to navigation or any other obstacle or obstruction.

Although the Green River is navigable up to river mile 30, this action should have minimal impacts on navigation. Only a small portion of the work will occur in the water, and the cofferdams installed to isolate the project from the mainstem river will be temporary and will be placed close to the shoreline with no effect on vessels navigating in the river channel.

#### **10.5 Coastal Zone Management Act (16 USC 1456 et. seq.)**

The Coastal Zone Management Act of 1972 as amended (15 CFR 923) requires Federal agencies to carry out their activities in a manner, which is consistent to the maximum extent practicable with the enforceable policies of the approved Washington Coastal Zone Management Program. The proposed action would create a side channel adjacent to the Green River, creating new shoreline upon project completion. This project would not cause substantial adverse effects to shore resources or the environment. After review of the City of Kent Shoreline Master Plan, the Corps believes this project is consistent to the maximum extent practicable. A Coastal Zone Consistency Determination concurrence has been prepared and submitted to the Department of Ecology (Appendix C). On 10 May 2010, a Coastal Zone Consistency Determination concurrence was received from the Washington Department of Ecology under the conditions of a Nationwide Permit 27 (Appendix G).

#### **10.6 National Historic Preservation Act (NHPA) (16 U.S.C. 470)**

The National Historic Preservation Act (16 USC 470) requires that the effects of proposed federal undertakings on sites, buildings structures, or objects included or eligible for the National Register of Historic Places must be identified and evaluated. The Riverview Park project is a Federal undertaking of the type which might affect historic properties. As such, it is subject to Section 106 of the NHPA. The Corps, in order to comply with Section 106 of

the NHPA, conducted historic properties studies for the proposed project. The APE for the project was defined as the park area, access road, and staging areas. There are no recorded properties listed in, or eligible for listing in the National Register of Historic Places (NRHP) within the project APE.

Section 106 requires consultation with the Washington State Historic Preservation Officer and a request for tribal concurrence with determinations of eligibility. The Corps initiated consultation with the Washington State Historic Preservation Officer (SHPO) and the Muckleshoot Indian Tribe of Indians Preservation/Cultural Resources Division for the project. Concurrence of "No Historic Properties Affected" was received from SHPO on 10 May 2010. A request for knowledge and concerns letter was sent to the Muckleshoot Tribe on 12 February 2010 (Appendix F). No response was been received from the Tribe to date.

### **10.7 Magnuson-Stevens Fishery Conservation and Management Act of 1976**

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act of 1976 and the 1996 Sustainable Fisheries Act (SFA), an evaluation of possible impacts to Essential Fish Habitat (EFH) is necessary for federal actions. For the Green River, Pacific salmon, including Chinook, coho, and pink salmon, are evaluated for EFH.

An EFH evaluation was completed in the initial programmatic consultation with NMFS. EFH conservation recommendations were administered to the Corps as part of this consultation, which the Corps intends to comply with for this project.

### **10.8 Fish and Wildlife Coordination Act (16 U.S.C. 661)**

The Fish and Wildlife Coordination Act (16 U.S.C. 661) requires that wildlife conservation receive equal consideration and be coordinated with other features of water resource development projects. The Corps conducted a programmatic consultation with USFWS for the Green-Duwamish ERP. A Fish and Wildlife Coordination Act Report was received for the Green-Duwamish ERP in association with the FEIS.

### **10.9 Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d)**

The BGEPA prohibits the taking, possession or commerce of bald and golden eagles, except under certain circumstances. Amendments in 1972 added penalties for violations of the act or related regulations.

No take of either bald or golden eagles is likely during the side channel project. There are no observed nests at the project site and no known nests within a half mile of the project site. Therefore, no adverse affect to eagles are anticipated. If a nest or juveniles are observed during construction, appropriate measures would be taken to ensure no harassment occurs.

### **10.10 Migratory Bird Treaty Act of 1918**

The Migratory Bird Treaty Act (MBTA: 16 U.S.C. §§ 703-711) establishes that the intentional or unintentional "take" of migratory birds, nests, eggs or bird parts is unlawful at any time. Take is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, collect, or possess, or any attempt to carry out these activities." A take does not include habitat destruction or alteration, as long as there is not a direct taking of birds, nests, eggs, or parts

thereof. Additionally, Executive Order 13186 states that it is the responsibility of Federal Agencies to protect migratory birds in coordination with the U.S. Fish and Wildlife Service.

The Corps anticipates there would be very minimal, if any, impacts to migratory birds as a result of the proposed project. Trees that need to be removed would be taken down in the late winter months (before April 1), prior to the breeding season. Therefore, there would be no nestlings present. Also, all trees to be removed are deciduous, making it easy to spot the presence of birds or nests prior to tree removal. The project has already been designed to minimize tree removal and impacts to nesting birds and other wildlife.

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#### **10.11 Wild and Scenic Rivers Act (16 U.S.C. 1271-1287)**

No portions of the Green River have been designated as a Wild and Scenic River and this act is therefore not applicable to the proposed work. .

#### **10.12 Executive Order 12898, Environmental Justice**

Executive Order 12898 directs every federal agency to identify and address disproportionately high and adverse human health or environmental effects of agency programs and activities on minority and low-income populations.

The project does not involve the siting of a facility that would discharge pollutants or contaminants, so no human health effects would occur. Therefore, the proposed action is in compliance with this order.

#### **10.13 Executive Order 11990, Protection of Wetlands, May 24, 1977**

No wetlands would be impacted by this project and therefore the action is in compliance with the order.

#### **10.14 Executive Order 11988, Floodplain Management, 24 May 1977**

Executive Order 11988 requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy of the floodplain, and to avoid direct and indirect support of floodplain development where there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains." The proposed action would not create a change that would affect occupancy of the floodplain. Excavating the channel would add storage to the floodplain, while the majority of the material from the excavation that would be placed in the park will be above the 100 year floodplain. Therefore, there should be a net increase in floodplain storage.

## **11.0 CONCLUSIONS**

Based on this Environmental Assessment and coordination with Federal agencies, Native American Tribes, and State agencies, the Riverview Park Side Channel project is not expected to result in significant adverse environmental impacts. The Riverview Park Side Channel project is not considered a major Federal action having a significant impact on the

human environment. Therefore, the preparation of an environmental impact statement supplement is not required.

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