Request for Design-Build Proposals

Multnomah and Wahkeena Creek Restoration Project – Phase I
Final Design and Construction

Mandatory Pre-proposal Meeting: June 5, 2013; 1:00PM at Rooster Rock State Park
Proposal Submittal Deadline: June 18, 2013 at 4:00PM

I. INTRODUCTION

The Lower Columbia Estuary Partnership (Estuary Partnership) requests proposals to review existing studies and designs, develop final design plans, provide technical support for project permitting, and construct Phase I of the Multnomah and Wahkeena Creek Restoration Project – an aquatic habitat enhancement project located along the lower portions of Wahkeena and Multnomah Creeks in the Columbia River Gorge. The Estuary Partnership developed this Request for Proposals (RFP) because it seeks to work with a single engineering/construction team that will oversee a design-build approach for Phase I of the project. The Estuary Partnership is using a design-build approach to enhance overall project cost efficiency through collaboration between the project team, design team, and implementation contractors. To emphasize and promote cost effectiveness, the Estuary Partnership seeks an engineering /construction team that will employ a progressive design-build methodology to iteratively evaluate project implementation costs in coordination with design development.

The following is intended to be a full explanation of the Estuary Partnership's request and evaluation of competitive sealed proposals.

II. ANTICIPATED SCHEDULE

Mandatory Pre-proposal Meeting: June 5, 2013 at 1:00PM
Proposal Question Period Closing: June 12, 2013 at 4:00PM
Proposal Closing: June 18, 2013 at 4:00PM
Proposal Opening: June 18, 2013 at 4:00PM (immediately after proposal closing)
Notice of Award: June 28, 2013
Contract Executed: July 15, 2013
Design Period: July 15, 2013 – September 15, 2013
Permitting Support: September 1, 2013 – October 31, 2013
Construction: June 9, 2014 – July 25, 2014
In-water construction window: July 1, 2014 – July 25, 2014

III. PRE-PROPOSAL MEETING AND SITE VISIT

A pre-proposal meeting will be held on June 5, 2013 from 1:00pm until approximately 3:30pm. Proposers should meet at the Rooster Rock State Park office located on the north side of Interstate-84 at Exit 25. It is mandatory that one member of each proposal team attend this meeting, which will include a site visit.

IV. QUESTIONS AND ASSOCIATED RESPONSES/CLARIFICATIONS

Proposers shall direct all questions regarding this RFP to the Estuary Partnership's Finance Manager, Tom Argent, via email: targent@estuarypartnership.org. Questions directed to other project team members or not submitted via email will not be answered. Interpretations or clarifications considered necessary by the Estuary Partnership in response to such questions will be issued in writing and emailed to all parties. Questions received after 4:00 p.m. on Wednesday June 12, 2013 will not be answered. Only questions answered by a formal RFP amendment will be binding, i.e., written amendments are the only means for changes to this RFP. Oral comments, statements, instructions and other interpretations or clarifications made by the Estuary Partnership or other project partners will be without legal effect. Proposers shall acknowledge receipt of amendments in their cover letter.

V. BACKGROUND

The project site is part of a 60-acre tract of historic Columbia River floodplain located at River Mile (RM) 136, ten miles downstream from Bonneville Dam (Attachment 1, Sheet G1). The site contains two perennial streams (Wahkeena and Multnomah Creeks), one unnamed intermittent stream that feeds Mist Falls, two man-made lakes (Benson Lake and Hartman Pond), and small wetland areas.

Prior to settlement, the Government Land Office (GLO) characterized the site as riparian forest dominated by ash, maple, Douglas fir, and willows. Wahkeena Creek meandered through the site and entered the Columbia River along the center line of present day Benson Lake. The unnamed creek draining Mist Falls flowed along the west end of the site, and Multnomah Creek flowed due north from its falls entering the river at the present location of the Multnomah Falls visitor parking area. There is no mention of ponds or lakes in the GLO surveyor's notes, and they do not appear in the 1935 aerial photo.

Three significant impacts have occurred at the site:

1. **Agricultural development (1920's-1940's):** Native riparian forests were removed, and initial road networks were developed.
2. **Transportation corridors/infrastructure (1940's- Present Day):** The most significant impact to the site resulted from the construction of the Union Pacific Railroad (UPRR), Historic Columbia Gorge Scenic Highway (historic highway), and I-84. Most disruptive was the construction of I-84 during which the Oregon Department of Transportation (ODOT) rerouted both streams into one culvert to form a common outlet to the Columbia River, excavated two large borrow pits for fill material, and diverted all or a portion of both streams through the borrow pits to form Benson Lake and Hartman Pond.
3. **Benson State Recreation Area (1940s- Present Day):** The final impact to this site was development of the Benson State Recreational Area, which includes a two-acre parking lot, a 120 foot box culvert over Wahkeena Creek, large areas of regularly mowed grass, and a Frisbee golf course.

During the baseline site assessment (see Relevant Existing Information section), the project team collected and reviewed extensive site data and identified the following limiting factors related to the above impacts, ecological function, and the site's current and potential ability to support multiple life stages of native species, including salmonids.

1. Water quality is impaired by stormwater runoff from impervious surfaces, discharge from Benson Lake and Hartman Pond, and diversion of Wahkeena Creek.
2. Stream temperature is impaired by diversion of Wahkeena Creek, thermal loading from Benson Lake and Hartman Pond, and dispersed thermal loading from degraded riparian cover.

3. Instream habitat quality and diversity is impaired throughout most of the site due to reduced wood loading and the channelization and diversion of both streams.
4. Habitat connectivity for native species, including ESA-listed salmonids, is impacted by passage constraints and thermal loading.
5. Sediment supply and sediment transport capacity is severely limited in many reaches due to undersized infrastructure, altered channel alignments, channel constrictions, and stream diversions.
6. Wahkeena Creek's hydrologic regime is impaired by the Hartman Pond diversion, which limits water depths available for spawning, and runoff from impervious surfaces.
7. Food web production and nutrient cycling are impaired by the dominance of Himalayan blackberry in the riparian zone and lack of instream habitat structure to retain organic inputs to the stream channels.
8. Riparian forests are on a declining trajectory due to the historic clearing of mature, native stands and competition from invasive species.

VI. PROJECT DESCRIPTION

The overall objective of this project is to address degraded environmental conditions on lower Multnomah and Wahkeena Creeks by developing management actions that balance ecological enhancement, i.e., addressing the limiting factors identified above, with recreational, tourism, transportation, and other uses. Specific goals of the project include the following:

1. Improve hydrologic processes
2. Improve thermal regime
    a. Reduce summer rearing temperatures
    b. Provide cool-water refugia immediately adjacent to the Columbia River mainstem for late outmigrants and returning adults
    c. Improve connectivity between habitats within the site
3. Improve water quality
4. Improve riparian/floodplain connectivity, processes, and health
5. Improve instream habitat diversity and function
    a. Over-wintering habitat (Lower Columbia River coho and steelhead)
    b. Summer rearing capacity (Lower Columbia River coho and steelhead)
    c. Spawning habitat (Lower Columbia River coho and steelhead)
6. Improve organic matter retention and food web production

VII. RELEVANT EXISTING INFORMATION

The Estuary Partnership completed a feasibility investigation and alternatives analysis in 2011, developed a water budget for Hartman Pond during summer 2012, and developed 30% design plans in December 2012. These documents and other applicable information are listed below.

1. Feasibility and Alternatives Analysis (2011)
2. Memorandum: Hartman Pond Water Budget (2012)
3. Phase I - 30% Design Report (2012)
4. Phase I – 30% Design Plan Set (2012)

The Feasibility and Alternatives Analysis is available upon request. All other documents are provided as attachments to this RFP.

VIII. ESTUARY PARTNERSHIP RESPONSIBILITIES

The Estuary Partnership will be responsible for the following work during the Project (subject to modification based on negotiations with the selected engineering / construction team):

- Coordinate project activities and necessary approvals with stakeholders, including landowners and water rights holders.
- Provide all background information available for the project, including GIS shapefiles, topographic survey data, hydraulic modeling, Hartman Pond water budget, georeferenced aerial images, LiDAR data, existing 30% design CADD drawings, and temperature and discharge data.
- Review and provide feedback on project designs (60% level of design) prior to submittal of permit applications.
- Prepare and submit all required permit applications, including, but not limited to, the following:
    - Section 404 of the Clean Water Act (including the wetland delineation)
    - Oregon Removal/Fill Regulations
    - Endangered Species Act
    - Columbia River Gorge National Scenic Area Act
    - National Environmental Policy Act
    - Oregon Scientific Take Permit
    - Multnomah County Grading and Erosion Control
    - Multnomah County Floodplain Development

  Note: The engineering / construction team will provide the Estuary Partnership with the technical/design information necessary to complete these applications and reviews.
- Provide all aspects of fish salvage/isolation during construction.
- Assist with construction oversight, as needed/appropriate.
- Coordinate and oversee all planting activities, except erosion control seeding and mulching required to stabilize disturbed areas after construction.
- Provide all post-construction reporting to grant funders and regulatory agencies.

IX. ANTICIPATED STATEMENT OF WORK

The statement of work includes review and assessment of previously completed hydraulic modeling and the Hartman Pond study (water budget), review and analysis of 30% design plans and report, development of final (60%) design plans and report, permitting support, and construction. This statement of work will be executed via the sample contract provided as Attachment 4, which will extend from July 2013 through September 2014. Contractor agrees to implement the statement of work in accordance with the project goals and objectives outlined in Section VI.

Task 1. Review Existing Reports and Design Plans

a. Contractor shall review existing Hartman Pond water budget (Attachment 3). Contractor shall provide a concise written assessment of its value in addressing critical project questions/data requirements, as well as recommendations for modifications to second phase of the study (to be implemented in 2013), which is intended to field-test results from the 2012 Hartman Pond water budget study.
b. Contractor shall verify the adequacy of the hydraulic analyses, including assumptions, model inputs and selection of design flows. Contractor also shall provide written recommendations for revisions or improvements to the hydraulic analysis.
c. Contractor shall review and assess all components of the 30% design plan set and report (Attachments 1 and 2). Contractor shall provide a concise written summary of risk and uncertainties as well as the design's ability to cost-effectively address project goals and objectives.

Contractor also shall provide a brief written summary of recommended design revisions, additional design needs, and recommendations for developing the 60% design plan set.

The Estuary Partnership will provide electronic versions of all project materials, including, but not limited to, water budget calculation spreadsheets, CADD drawings, topographic survey data, and HEC-RAS hydraulic model.

Schedule: July and August 2013.
Deliverables: A memorandum detailing the written elements identified above.
Deliverable Due: August 9, 2013.

Task 2. Prepare 60% Design Plans, Design Report, and Cost Estimate

a. Hydraulics – perform hydraulic analysis as necessary to determine effects of restoration actions on water surface elevations in the project area and the capacity of the parking lot culvert.
b. Existing infrastructure – determine locations of existing surface and subsurface infrastructure and incorporate into project designs. Available information regarding subsurface utilities is provided in Attachment 6.
c. Construction Plans – prepare and submit draft and final design plans (60% level of design) for the following project elements:
    - Habitat structures – including locations, configurations, and quantities for logs and snags, as well as cabling, and anchoring methods;
    - Modification of Wahkeena Creek diversion structure and Hartman Pond's eastern outlet structure;
    - Stormwater treatment for the western half of the Benson State Park parking lot;
    - Grading plans, along with excavation quantities;
    - Site access, staging areas, dewatering, erosion and sediment control, and materials disposal;
    - Materials volumes and specifications; and,
    - Tax lot boundaries, Ordinary High Water, 100-year floodplain, and other details required for project permitting.
d. Draft and final cost estimates.
e. Draft and final design report, including modeling results and design criteria for each project element.
f. Permitting support – provide technical information required for the Estuary Partnership to complete and submit project permit applications.

Assumptions: 1) Hydraulic modeling of the I-84 culvert will not be required.
2) Two rounds of edits/comments to draft plans before finalizing.
3) One round of edits/comments to draft design report before finalizing.
4) Estuary Partnership will coordinate and summarize stakeholder comments.

Schedule: July 2013 – October 2013.
Deliverables: Draft and final versions of 60% plan set, design report, and cost estimates.
Deliverables Due: Draft deliverables due September 4, 2013. Final deliverables due September 15, 2013. Permitting support to take place during September 2013 and October 2013.

Task 3. Construction and Construction Oversight

a. Construction – Contractor shall provide all equipment, operators, and materials (except Agency-provided materials outlined in Attachment 5) to implement the project as designed and specified, including, but not limited to, mobilization, access, control of water, erosion control, site security,

implementation, and site reclamation. Contractor shall construct the project in compliance with all applicable regulations and project permits, including, but not limited to, those identified in Section VIII of this document.

b. Oversight and contract management – Contractor shall manage and oversee all construction activities. Contractor shall manage all contracts necessary to complete the project and shall coordinate construction activities with the Estuary Partnership's Principal Restoration Ecologist and, as necessary, OPRD staff.
c. Post-Construction Reporting – Contractor shall review the Estuary Partnership's post-construction report and provide written comments. Contractor also shall submit electronic copies of all photos taken during construction.

The Estuary Partnership will lead all elements of fish salvage and author and submit all post-construction reporting.

Schedule: June 9, 2014 – July 25, 2014. Contactor may mobilize equipment and materials on-site no earlier than June 9, 2014. Contractor shall complete all in-water work between July 1, 2014 and July 25, 2014.
Deliverables: Construction of the project, as detailed in 60% plan set.
Deliverables Due: All construction substantially complete by July 22, 2014 and complete and ready for final payment by July 25, 2014.

X. PROPOSAL REQUIREMENTS

Proposals shall adhere to the following outline and include all information detailed below. Proposals also shall strictly adhere to the prescribed page limits. Failure to submit any of the required information or adhere to the page limits will render the proposal non-conforming, and the proposal will be rejected.

1. *Qualifications and References*
    a. *Project Team. (one page summary with one-page resumes attached for no more than five personnel)*
        - Identify lead design firm and lead construction firm.
        - Design firm project manager and lead technical staff (maximum of three individuals). Include hourly billing rates and availability.
        - Construction contractor project manager and lead staff (maximum of two individuals).
        - Lead contractor's Oregon Construction Contractors Board license number.
        - List of **all** subcontractors and services provided.
    b. *Qualifications. (three pages narrative)*
        - Narrative of lead design firm and lead construction contractor qualifications and experience.
        - Brief profiles of key staff not included above.
        - History of project team working together on similar projects.
        - Team experience with innovative stormwater design and construction.
        - Team experience with stream restoration design and construction, particularly in constrained circumstances, e.g., in close proximity to recreation and transportation infrastructure.
    c. References (one page total)
        - Three client references for similar projects completed within the past five years. For each reference, please include client contact information and project details (name, location, brief description, etc.). References for the project team as a design/build unit are preferred, but not required.

2. *Project approach (three pages narrative)*
   Narrative detailing the following:
   a. Approach to restoration design and construction, including, but not limited to, the following:
      - Understanding predominant ecosystem processes and developing restoration designs that work in concert with those processes;
      - Sustainably addressing a site's limiting factors;
      - Addressing the concerns of a diverse stakeholder group;
      - Managing restoration designs to sync with maintenance capabilities of site managers; and,
      - Tailoring designs to conform with site use and public safety concerns.
   b. Proposed approach to each element of the statement of work. Briefly describe how the work will be broken down among your team. Define subtasks as necessary.
   c. Proposed revisions or additions to the statement of work and/or design. Proposers are encouraged to propose alternative design and construction methods they think will increase the likelihood of the project meeting the stated objectives, better protect adjacent infrastructure, reduce maintenance, increase cost-effectiveness, or otherwise benefit the project.
   d. Construction approach.
   e. Approach to identifying opportunities to realize cost savings through the design, budgeting, and construction process. Identify how the construction process could be adaptively managed to capitalize on cost-savings and convert them to added on-the-ground restoration.
3. *Budget (one page tabular budget; one page narrative)*
   a. Provide a budget for each element of the statement of work using the MS Excel spreadsheet provided. Spreadsheet provided must include all project costs.
   b. Provide a brief narrative for each budget item.
   c. If applicable, provide a separate budget and associated narrative for each suggested alternative/additional statement element.
      Note: In order for a proposal to be considered, it must include proposed construction costs for the project design presented in the 30% plan set.
4. *Schedule (one page)*
   a. Narrative detailing the project team's ability to meet the proposed schedule, particularly completing all design elements by September 15, 2013 and all in-water construction between July 1, 2014 and July 25, 2014.
   b. Provide additional narrative detailing the availability of key personnel during the proposed schedule.
5. *Additional materials*
   a. The proposer shall attach a cover letter, not to exceed one page in length. The cover letter must be signed by an authorized representative of <u>both</u> the engineering and construction firms. <u>The cover letter also shall contain an acknowledgement of receipt of all amendments, the numbers of which must be written on the cover letter.</u>
   b. No additional materials should be submitted with the proposal. The project team will review only the materials identified above and will <u>not</u> consider additional materials in their evaluation.

XI. ANTICIPATED BUDGET

Based on existing information (including the 30% plan set), the Estuary Partnership anticipates final design and construction costs to be approximately $200,000. The Estuary Partnership has secured $105,000 and anticipates securing the difference through pending and future funding requests; however, the final construction scope and budget will be scaled to meet available funding.

XII. PROPOSER'S RESPONSIBILITIES

It is the responsibility of each proposer before submitting a proposal to:

1. Examine and carefully study the RFP and other related data identified in the RFP;
2. Visit the site to become familiar with and satisfy proposer as to the general, local, and site conditions that may affect cost, progress, performance, or furnishing of the work;
3. Become familiar with all federal, state, and local laws and regulations that may affect cost, progress, performance, or furnishing of the work;
4. Study and carefully correlate proposer's knowledge and observations with the RFP and other related data; and,
5. Promptly notify the Estuary Partnership of all conflicts, errors, ambiguities, or discrepancies that proposer has discovered in the RFP.

By submitting a proposal, proposer confirms that he/she has completed the above. Neither the Estuary Partnership, Oregon Parks and Recreation Department, Oregon Department of Fish and Wildlife, U.S. Forest Service, or any project partner assumes any responsibility for errors or misinterpretations resulting from use of the RFP or associated documents.

XIII. PROPOSAL SUBMITTAL, DEADLINE, AND REVIEW

Proposals shall be submitted electronically (PDF file format, attached to an email) to Tom Argent (targent@estuarypartnership.org). Proposals must be received no later than Tuesday June 18, 2013 at 4:00PM; proposals received after this date/time will not be considered. The Estuary Partnership will provide confirmations of receipt for all submittals received prior to the deadline. All proposals are firm, binding, and irrevocable for thirty (30) days after opening of the proposal.

Proposals will be reviewed immediately after the submittal deadline. Proposals will not be considered if they fail to contain any documentation required by the instructions and materials herein. The Finance Manager Project Manager will notify all proposers of the Estuary Partnership's decision.

XIV. SELECTION PROCESS

Proposals will be reviewed by the project team, including representatives from the Estuary Partnership and Oregon Parks and Recreation Department. The selection team will consider the following criteria in their evaluation of proposals:

1. Qualifications (30%)
    - Design and construction experience relevant to project in scope, scale, location, and setting. Particular attention will be given to experience designing and constructing innovative stormwater facilities, as well as experience working in close proximity to transportation and recreation infrastructure.
    - Experience and design philosophy of the project manager and key staff.
    - Experience working together as a design/build team.
    - References. Evidence of good working relationship and flexibility between project team and clients.

2. Project approach (30%)
    - Approach to working in concert with predominate ecosystem processes;
    - Approach to sustainably addressing limiting factors;
    - Approach to addressing the concerns of a diverse stakeholder group, including public safety and maintenance concerns;
    - Process for reviewing existing project documents and proposing modifications;
    - Approach to final design process and clarity of proposed deliverables (including proposed approach to working with project team to control costs throughout the design process);
    - Alternative designs/approaches proposed;
    - Approach to construction, including approach to controlling costs and converting savings to added on-the-ground work.
3. Cost/Budget (25%)
    - Cost for each task.
    - Proposed approach for realizing cost efficiencies through the design-build process and translating them to additional on-the-ground work.
    - Ability to provide all scoped services within the proposed budget.
4. Schedule/Availability (10%)
    - Ability and commitment to provide all scoped services within the design and construction schedules outlined.
    - Availability of key project personnel.
5. Overall proposal presentation (5%)

During its evaluation, the Estuary Partnership reserves the right to contact references of any team member relating to the past performance of similar services, compliance with specifications and contractual obligations, and lawful payment of suppliers and subcontractors. The Estuary Partnership also reserves the right to accept or reject any and all of the proposals received as a result of this RFP, including without limitation non-conforming, non-responsive, unbalanced, or conditional proposals. The Estuary Partnership further reserves the right to reject the proposal of any proposer whom it finds, after reasonable inquiry and evaluation, to be non-responsible. The Estuary Partnership may also reject the proposal of any proposer if the Estuary Partnership believes that it would not be in the best interest of the project to make an award to that proposer. The Estuary Partnership also reserves the right to request the selected proposer negotiate and submit a revised statement of work, proposal, and cost estimate.

The Estuary Partnership is not obligated to pay any costs incurred by proposers in responding to this RFP.

XV. ATTACHMENTS

1. 30% Design Drawings
2. 30% Design Report
3. Memorandum – Hartman Pond Water Budget
4. Sample Contract
5. Agency-Supplied Materials
6. Map of Known Subsurface Infrastructure

Attachment 1 – 30% Design Drawings

Multnomah and Wahkeena Creek Restoration Project – Phase I

Attachment 2 – 30% Design Report

Multnomah and Wahkeena Creek Restoration Project – Phase I

COLUMBIA RIVER ESTUARY STUDY TASKFORCE

MULTNOMAH AND WAHKEENA CREEKS RESTORATION PROJECT

30% DESIGN REPORT

December 7, 2012

HENDERSON

Environmental Design-Build Professionals

HERRERA

PREFACE

HENDERSON Environmental Design-Build Professionals has prepared this report for the exclusive use of the Lower Columbia Estuary Partnership, and its reviewing agency representatives. Findings reported herein are based upon site conditions at the time of the study, information provided by the Estuary Partnership or gathered in the field by HENDERSON staff, HENDERSON's best professional opinion and our understanding of the design considerations provided by Estuary Partnership.

EXECUTIVE SUMMARY

The Lower Columbia Estuary Partnership is seeking to increase available salmonid habitat throughout the lower Columbia River estuary. Their objective is to restore Lower Columbia River habitat critical to the recovery of Threatened/Endangered salmonid species that utilize the lower Columbia River and its tributaries. Specific habitat types targeted by the Estuary Partnership are shallow water, riverine and tidal habitats that are adjacent to the lower Columbia River mainstem.

The Multnomah and Wahkeena Creek Restoration Project addresses 60 publically owned acres in the Columbia River Gorge National Scenic Area (CRGNSA), that includes Multnomah Falls and Benson State Recreation Area. The long-term objective is to restore aquatic habitat throughout this property and ensure high quality conditions for native salmonids. The Estuary Partnership has prioritized Multnomah Creek below Benson Lake, Wahkeena Creek below the Union Pacific Railroad Bridge, and areas within Benson State Recreation Area for immediate restoration.

HENDERSON's 30% design for Multnomah and Wahkeena Creeks balances a desire for overall habitat complexity with an emphasis on restoring natural channel processes and the creation of rearing and refuge habitat for native salmonids. This Design Report addresses these design considerations, their practical constructability, and their benefits to habitat restoration and enhancement for Threatened and Endangered salmonid species within the lower Columbia River.

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INTRODUCTION

The Lower Columbia River Estuary Partnership (Estuary Partnership) is working with a group of stakeholders to develop enhancement and restoration actions on Wahkeena and Multnomah Creeks in the Columbia River Gorge National Scenic Area (CRGNSA). Evaluation of site conditions suggests that landscape alterations and resource management practices continue to shape ecological conditions within riparian, fluvial and lacustrine systems. Key physical processes have been altered, which has led to complex, system-wide responses. Due to these factors, habitat favorable for sustaining populations of native species, including ESA-listed salmonids, has been reduced. In some cases, conditions appear to be on a continued downward trend, placing incremental stress on native populations and producing conditions that favor non-native, invasive species. Without intervention, a further decline in populations of ESA-listed salmonids and a reduction in water quality and biological diversity are expected to continue, if not worsen.

The overall objective of this project is to address environmental conditions on lower Multnomah and Wahkeena Creeks by developing management actions that balance ecological enhancement with recreational, tourism, transportation, and other uses in this critically important portion of the CRGNSA. There are a diverse set of natural resource management goals within the project site and the secondary purpose of this project is to facilitate development of a cohesive management plan (LCEP et al., 2011). HENDERSON Environmental Design-Build Professionals together with HERRERA have developed 30% Designs for the Multnomah and Wahkeena Creek Restoration Projects.

BACKGROUND AND RATIONALE

The Multnomah and Wahkeena Creek Restoration Project addresses 60 publically owned acres in the Columbia River Gorge National Scenic Area that includes Multnomah Falls and Benson State Recreation Area. The long-term objective is to restore aquatic habitat throughout this property and ensure high quality conditions for native ESA listed salmonids. Based on an alternative analysis completed in 2011, the Estuary Partnership has prioritized Multnomah Creek below Benson Lake, Wahkeena Creek below the Union Pacific Railroad Bridge, and areas within Benson State Recreation Area for immediate restoration.

HENDERSON Environmental Design-Build Professionals together with HERRERA and the Estuary Partnership developed Conceptual Designs and completed the Multnomah and Wahkeena Creek Feasibility Analysis in May 2011. Conceptual designs primarily focused on habitat enhancement in Lower Multnomah and Wahkeena Creeks, with the addition of Engineered Large Woody Debris Habitat Structures, and enhancement of the riparian zone. Addition design components included a roughened riffle chute at the I-84 culvert outlet, a stormwater facility at the Benson Lake Parking Lot, and a Pollution Treatment Manhole at the Multnomah Falls Parking Lot.

The 2011 Alternatives Analysis addressed the following three major project components:

- Baseline site investigations – Collection and analysis of baseline data required to inform alternatives analysis and design;
- Feasibility and alternatives analyses – Development and analysis of enhancement alternatives for each subreach;
- Conceptual designs – Development of conceptual level designs for each subreach's preferred alternative.

Phase 2, 30% Design Development, is a continuation from Phase 1, Conceptual Designs, and builds off the aforementioned Multnomah and Wahkeena Creek Feasibility Analysis.

The six actions investigated under Phase 2 are:

1. The elimination or retrofitting of the Wahkeena Creek/Hartman Pond diversion structure.
2. The replacement or retrofitting of the Wahkeena Creek culverts beneath the Benson State Recreation Area parking lot access road.
3. The decommissioning of the Hartman Pond/Wahkeena Creek return-flow pipe including an assessment of the viability of the existing pond standpipe.
4. Enhancement of fish habitat within Wahkeena Creek between the parking lot and I-84 culverts.
5. The enhancement of the riparian buffer along both Wahkeena and the reach of Multnomah Creek between Benson Lake and the I-84 culvert.
6. The treatment of stormwater from the western half of the Benson State Park parking lot prior to discharging into Wahkeena Creek

EXISTING CONDITIONS

Assessment and documentation of existing conditions, in addition to a site overview and history for the Multnomah and Wahkeena Creeks, was completed during Phase 1 and is summarized in the March 2011 Feasibility Analysis (LCEP et al, 2011). Additional data collection for Phase 2 included a detailed topographic survey, supplementary field reconnaissance and site investigation, and further hydrologic and hydraulic assessment.

EXISTING CONDITIONS STUDIES

Hydraulic Engineering Assessment

HERRERA completed their Engineering Support Memorandum in August 2012, documenting hydraulic calculations and geomorphic considerations related to 30% design plan development. The Memorandum is attached in Appendix A, and covers a Culvert Conveyance Assessment of the Benson Stake Park Access Road Culvert, Lower Wahkeena Creek Channel Grade Design and Habitat Structure Design, Hydraulic Model Development, Lower Multnomah Creek, and future data needs.

Hydraulic Model Development

To support preliminary design of the Large Woody Debris habitat structures and the restored channel reach of lower Wahkeena Creek, a simple one-dimensional hydraulic model (created using the HEC-RAS version 4 modeling program) was created for existing channel conditions. The model was used to provide initial estimates of water surface elevations and potential scour depth at structures during large

flood events, and can be expanded upon in the future as the project design is developed (Herrera, 2012).

Ongoing Estuary Partnership Studies

During the development of 30% Designs, the Estuary Partnership has been performing a suite of ongoing studies to investigate channel and pond conditions at Benson State Park. These have included pond bathymetry, stage, and thermal mapping, in addition to monitoring flows to inform the development of a water budget for Hartman Pond. This water budget has been employed to inform the management and design solutions for the water control structures into and leaving Hartman Pond.

FISHERIES

As reported in the LCEP et al., 2011 Feasibility Analysis, the project site historically functioned as an active part of the Columbia River floodplain that was inundated annually during the spring freshet. Based on knowledge of Columbia River salmon life histories, salmon use floodplain habitats such as these extensively during their outmigration through the Columbia River estuary (Bottom et al., 2005). Although no data detailing historical fish use at the site are available; it is likely that a variety of ESUs used the site not only for spawning and rearing, but also as off-channel habitat.

The project site currently is inundated only during the very highest flood flows, e.g., the 1996 floods, however it is known to support spawning and rearing of ESA-listed salmonids. Because the site is not inundated routinely and as passage conditions for juvenile salmonids at the I-84 culvert preclude access to the site at all flows (Myers et al., 2003), it is unlikely that salmonids other than those spawned on-site utilize the majority of its habitat (LCEP et al., 2012).

In Wahkeena Creek, spawning and incubation likely are limited to the reach located downstream of the park entrance road. In Multnomah Creek, spawning and incubation occurs upstream of Benson Lake only (outside of the current project area). Rearing likely occurs site-wide, except within areas that are temperature limited during low-flow periods.

Benson Lake and Hartman Pond also support a variety of aquatic and terrestrial species (LCEP et al., 2011) that will be supported through project restoration measures. American Beaver (*Castor canadensis*) presence has been noted throughout the project site, and restoration actions will seek to provide habitat improvements in Lower Multnomah Creek.

In addition to improving physical habitat conditions, the project's design intent is to increase the volume of cool water in Wahkeena and Lower Multnomah Creek, for resident and out-migrating salmonids. A reduction in flow diversion from Wahkeena Creek to Hartman Pond maintains a greater volume of Wahkeena Creek flows within the channel and is in-line with this project objective. Further discussion can be found under Diversion Structures.

30% DRAFT DESIGN

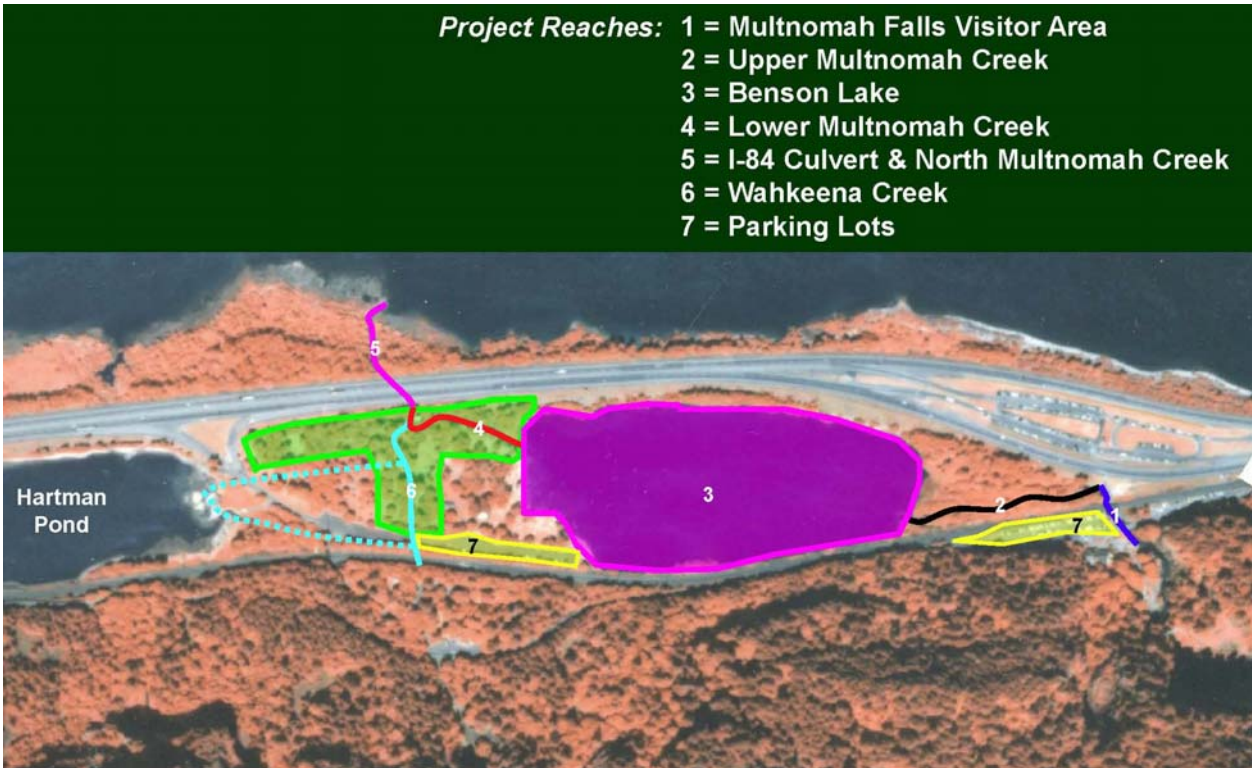

Figure 1. Project Reaches

Both Multnomah and Wahkeena Creeks plummet off of the Gorge wall into alluvial bottomlands, which are part of the Columbia River floodplain. The project reach of Wahkeena Creek is situated within a dynamic geomorphic environment. Upstream of the project site, above the railroad bridge, there are large volumes of material deposited from high flow events in Wahkeena Creek. Notable floods on record that have been observed include 1996 and 2003 flood events. Bed elevations on both Wahkeena and Multnomah creeks changed significantly with an estimated 3-5 feet of deposition within the channels (LCEP et al., 2011). The material stored in this alluvial fan has the on-going potential to transport into the project reach during high flow events. The lower reach of Wahkeena Creek, downstream of the access road culverts is situated within a lower energy environment and is influenced by backwater from the I-84 culverts, and also high Columbia River stage (above the I-84 outlet culvert invert). Given the dynamic nature of this site, restoration designs seek to reverse the degrading habitat trend, and restore a diversity of geomorphic processes with channel grading and the introduction of LWD habitat structures. LWD structures and channel grade enhancements are designed to cover a range of elevations and to restore natural channel processes, allowing for long term habitat gains within the context of this dynamic environment.

WAHKEENA CREEK CHANNEL RESTORATION

Channel Grade

Lower Wahkeena Creek is a constrained system with respect to channel planform and channel grade. The upstream and downstream extents of the project reach are fixed by the Benson State Park access road culverts and the I-84 culvert, respectively (Herrera 2012).

Through collaboration with the Estuary Partnership, and project stakeholders, 30% design development concluded that an optimum channel grade of 1.5% be designed for improved fish passage and habitat conditions. The preferred solution as shown in the Wahkeena Creek profile (See 30% Plans, Sheet WC2) balances cut from the aggraded upper reach of Wahkeena Creek (Sta 4+30 to 5+80), with fill in the lower reach (Sta 1+65 to 4+30). This is a slight variation of Option 2, as described in Herrera's memorandum. Subsequent discussion with the Estuary Partnership led to the continuation of 1.5 feet of substrate excavated through the parking lot culverts (see below). This solution creates approximately 460 feet of enhanced channel at the design slope of 1.5%.

Pool and riffle spacing was calculated for an approximate project reach of 500 feet, with an average channel width of 10 feet. In channels such as Wahkeena Creek pool spacings are typically 5-7 channel widths; equating to every 50-70 feet for this project reach. Channel planform, existing geometries and the location of existing tree stands were also considered and proposed pool and riffle spacing was located accordingly (See 30% Plans, Sheet WC1). A detailed discussion of channel grade design is covered in Herrera's 2012 Memorandum, Appendix A.

LWD Habitat Structures

Introduction of LWD provides immediate habitat lift for both aquatic and terrestrial species within the project area and facilitates restoration of the attributes of a properly functioning alluvial system. Research over the past two decades has shown that LWD improves fish habitat by increasing types and sizes of pools, sediment storage, and scour (Skaugset et al. 1996). A major advantage of large wood installation is that it re-establishes one of the natural roles of large woody debris in streams by creating a dynamic near-bank environment that traps organic material and provides colonization substrates for invertebrates and refuge habitats for fish. Limited numbers of trees and substantial woody riparian vegetation within the Wahkeena Creek riparian area do not offer the opportunity for natural LWD recruitment. During channel enhancement the opportunity to import LWD, and increase riparian plantings is optimal to provide the additional habitat lift that such structures offer juvenile salmonids.

As noted in the Feasibility Study (LCEP et al., 2012), Fox and Bolton (2007) assessed natural wood loading rates in Washington streams, which Inter-fluve (2010) reviewed, summarized, and reported as being applicable to a similar project site in the CRGNSA. For streams with similar size and climatic region as Multnomah and Wahkeena Creeks, Fox and Bolton (2007) found median LWD densities of 52 pieces per 100 meters. These guidelines were incorporated into project designs.

LWD installations, shown in the details, are comprised of a few key members, with brush and smaller pieces of LWD completing the habitat structure (See 30% Plans, Sheet WC3). Additional LWD members were incorporated through the riffle for both grade control, and to create a diversity of morphologies and channel habitats. A complete description of LWD Habitat Structure design can be found in Herrera's Memorandum (Appendix A).

Pin piles (vertical snags) incorporated into the design of the LWD structures provide elevational diversity within the riparian area, and offer some roosting habitat for local birds. Pin piles will be used to brace LWD habitat structure logs, thereby limiting the use of cabling and the use of ballast boulders. Henderson proposes to employ rebar to pin logs together, utilizing an approach that is both effective but with limited visual impact.

RIPARIAN ENHANCEMENT

The existing riparian forest is on a declining trajectory due to lack of recruitment resulting from impaired mainstem hydrology, competition from invasive species, prior agricultural disturbance, and current recreational and tourism uses. It follows that food web production and cycling is likely impaired by homogenization of riparian vegetation and lack of instream habitat structure to retain organic inputs to the stream channels (LCEP et al., 2011).

30% Designs call for extensive planting of the riparian zone for both Lower Wahkeena and Multnomah Creek. In addition to reversing the trends described above, riparian plantings will also protect the channel margins from the high visitor traffic that Benson State Park receives. Phase 1 planting will include 1,800 plants per acre, with placement consistent with naturally occurring plant communities. Refer to 30% Plans, Sheet L1 for the planting plan palette, and enhancement area.

PARKING LOT CULVERT EXCAVATION

“Because sediment has partially filled the twin (channel box) culverts conveying Wahkeena Creek under the access road to Benson State Park, the project design includes removal of some of this sediment to increase conveyance. The increase in culvert capacity must at a minimum equal the flow capacity lost by blocking the upstream diversion structure to Hartman Pond to prevent any increase in access road flooding potential as a result of this action. To ensure that the project design adequately increases the capacity of the Benson State Park access road culvert, a simplified conveyance calculation was performed”. This is described in further detail in Herrera’s 2012 Memorandum (Appendix A).

The optimum excavation determined for 30% Designs was 1.5 feet of material removal through the box culverts (See 30% Plans, Sheet WC2). It is important to acknowledge the geomorphic context of the site within an aggrading alluvial environment. As noted in Herrera’s memorandum, “because there is active sediment transport in Wahkeena Creek during storm flow conditions, and there is a large amount of sediment stored in the channel upstream of the project reach, it should be assumed that the Benson State Park access road culvert will fill again with sediment. Culvert cleaning and stream channel grade changes in the project design are short-term measures that are expected to change with future high flow events”.

LOWER MULTNOMAH CREEK

Overall, within this project reach, the channel is entrenched with very limited instream morphological diversity. The channel is isolated from its floodplain and the banks are nearly vertical. Streambanks along river right (facing downstream) are more than 5 feet in height and are mostly cohesive in nature. This reach is nearly straight with an estimated sinuosity of 1.1 and a gradient of .001ft/ft (LCEP et al., 2011).

The design and installation of LWD habitat structures intends to improve local conditions and create habitat diversity in Lower Multnomah Creek. Conceptual designs proposed six structures, divided between both banks of Lower Multnomah channel. During 30% design development, it was determined that greater habitat gains could be achieved in Lower Wahkeena Creek. With a shift in design emphasis fewer structures were allocated for Lower Multnomah Creek. Concerns for the ODOT I-84 highway corridor, and bordering utilities, refined the Lower Multnomah Creek designs into two adjoining structures on the left (south) bank of the channel (see 30% Plans, Sheet MC1). LWD habitat structures will be backfilled with gravel excavation from the parking lot culverts (*and Wahkeena Creek diversion location)*. Lower Multnomah Creek is known to be sediment starved, as it lies downstream of Benson Lake. Gravel augmentation and the installation of LWD habitat structures will create localized habitat enhancement in the lower reaches of this channel.

At the Estuary Partnership's request 30% designs include the addition of a beaver dam support structure in Lower Multnomah Creek. This is designed to encourage beaver activity away from the I-84 culvert on which previous dam attempts have been made. A series of small diameter pin piles would be driven into the bed of Lower Multnomah Creek to trap debris. Piles would be of sufficient length to allow for a functional elevation of beaver dam to be minimum of 27 inches above culvert invert, the previously observed beaver dam elevation (pers. comm. 2012).

Limited channel survey has currently been performed for Lower Multnomah Creek. A small number of preliminary cross sections were sampled during conceptual design. Our current understanding based on existing data findings in the project Technical Report (LCREP et al. 2011) is that the channel is oversized and characterized by low velocity flow. Further survey and hydraulic and hydrologic assessment are recommended to inform the final design of LWD Habitat Structures.

DIVERSION STRUCTURES

WAHKEENA CREEK DIVERSION TO HARTMAN POND

To maximize the amount of water in Wahkeena Creek throughout the year, a necessity to maximize benefit for the cold-water fishery, management of the Wahkeena Creek diversion structure is required. As discussed with the Estuary Partnership (pers. comm. 2012) the diversion gate will be mostly closed. Some flow diversion (0.5 cfs) will be allowed to maintain the Hartman pond elevation. During the summer months, it is believed that pond elevation is balanced through a) embankment seepage at the valve and water passing through the valve with water leaking out through the standpipe and seeping through the I-84 embankment. In the final design phase, computations can be performed to determine what size opening would provide the approximately 0.5cfs to balance that side of the equation.

One method to immobilize the valve from tampering would be the installation of a bracket that would fit over the nut and threaded rod that now operates the valve. This bracket would have the capacity to be locked with a padlock. This bracket would also secure a smooth sleeve over the operating nut and prevent unauthorized personnel from opening or closing the valve. The valve would still be adjustable provided one has the key or combination to the lock and removes the bracket and sleeve (See Plan Set, Sheet HP1). An additional measure of security or control, if desired, would be the installation of a pair of redhead, or equivalent, concrete anchors into the valve box above the gate preventing the valve being opened beyond a predetermined level (See Plan Set, Sheet HP1). Limiting the opening to the

agreed upon area will thereby limit the hydraulic capacity of the valve. These measures would be relatively inexpensive and straightforward to deploy and would be maintenance free.

It is expected that additional material will be generated during the excavation of the forebay area adjacent to the diversion structure, and upstream of the parking lot culverts. This material can be used for gravel augmentation in Lower Multnomah Creek as approved by the Estuary Partnership (pers. comm. Sept 2012).

From the Technical Memorandum: Multnomah & Wahkeena Creek Restoration Project Feasibility and Alternatives Analysis (2011), 'A certificate of water right granted to the State of Oregon in 1960 permits diversion of up to 30.0 cubic feet per second from Wahkeena Creek to Wahkeena Rearing Lake (today called Hartman Pond.' If ODFW was to divert their full right, Wahkeena Creek would be diverted in its entirety for the majority of the year. The cooperation between the State and the Estuary Partnership limiting the amount of water diverted from Wahkeena Creek will maximize the habitat available in both the cold and warm water fisheries as opposed to favoring one above the other. The proposed solution would not require modification of the existing water right.

HARTMAN POND DIVERSION TO WAHKEENA CREEK

It is desired to make the standpipe the primary outlet for Hartman Pond (the Estuary Partnership). The most cost effective and straight forward solution is to raise the elevation of the flashboards at the alternate outlet in the northwest corner of the pond (See Plan Set, Sheet HP2) thereby diverting water to the stand pipe. Currently the outlet's hydraulic capacity is negatively impacted by deposition of sediment in front of the filter screens. A small amount of excavator work would remove this material and re-grade the outlet to improve the hydraulic efficiency of the opening. An additional level of flashboard would be inserted in the slats beneath the existing screen to close the gap at the top of the screen. Closing the gap and cleaning off the other screens will ensure that the outlet functions when needed and prevent debris from entering the relief pipe and diminishing its capacity. A new set of flashboards can then be installed in the already existing brackets to effectively raise the outlet elevation of the pond at this secondary outlet.

HARTMAN POND STANDPIPE TO COLUMBIA RIVER

Shawn Stanley PE and Chris Collins performed a preliminary structural evaluation on October 11, 2012. It was found that the platform could easily support two people and was still fairly solid. The standpipe is 3-feet in diameter and has a wall thickness of ½ inch. The pipe is no longer plumb vertically but does not move when forcefully shaken. It appears that historically, a chain hoist was installed to support the standpipe and keep it from leaning further off vertical. The hoist is integrated into the platform. The debris screen is fabricated of stainless steel and is in good condition and has very little corrosion present. From the top of the pipe down four feet there is only a small quantity of surface rust. Below the water surface on the day of inspection, one of the lowest days the pond will be in any given year due to it being the end of the summer and prior to autumn rains beginning, there was a negligible amount of corrosion or algae on the pipe. In the professional opinion of HENDERSON's engineer, the portion of the standpipe visible that day has a significant amount of functioning life left.

Conversely, the culvert running beneath the freeway appears to be in a degraded state and should be evaluated by an engineer specializing in this discipline, such as an Oregon Department of Transportation bridge engineer or licensed structural engineer. Henderson's engineer's hypothesis why the standpipe

has a long design life left and this length may not is for two reasons. One, it has a thinner wall thickness than the standpipe; two, this length of pipe is regularly exposed alternately to air and water throughout the year which facilitates corrosion as opposed to the standpipe which stays submerged almost continually. A potential fix, without having to excavate through I-84 and install a new culvert, would be sliplining. This is a process where a new, smooth plastic culvert is jacked inside the existing metal culvert and grout is pumped between the existing, failing metal culvert and the new plastic pipe. This holds the new pipe in place and adds to the structural ability of the failing pipe. The plastic pipe is smooth, decreasing its roughness and increasing its hydraulic capacity, compensating for the smaller hydraulic diameter.

Please also refer to Appendices B for ODFW email thread and sketch.

PARKING LOT STORMWATER FACILITY

Rain that falls onto the eastern half of the parking lot at Benson State Park currently flows directly into Wahkeena Creek. Unimpeded stormwater discharge into natural systems increases scouring in streams and rivers because of the lack of attenuation on the impervious surface and introduces pollutants that would otherwise be filtered when passing through vegetation and/or wetlands. The project goal is to bring the parking lot into compliance with local ordinances. The first step is to collect the stormwater prior to reaching the creek. Installation of a combination of storm and trench drains in the parking lot will accomplish this.

Collected water will flow downgrade, through approximately 300-feet of pipes, past the picnic and pedestrian areas to a stormwater detention area adjacent to Wahkeena Creek. This stormwater area will function as vegetated swale and wetland area allowing pollutants and sediment to settle out before the water re-enters the creek. The area will be located in an existing depression that will minimize or negate any encroachment on the existing recreational area, minimize excavation necessary to get the capacity needed to comply with laws, and minimize the loss of trees in the National Scenic area that the park is located in. The location will not interfere with pedestrian, vehicle, or maintenance traffic or existing utilities on site.

30% DESIGN SUMMARY

These design steps seek to address the six actions to be investigated under Phase 2 (See Background and Rationale above) and address the project goals and objectives identified in the 2011 Feasibility Analysis.

Restoration of Wahkeena Creek seeks to restore natural processes through installation of LWD to create habitat and morphological diversity. Together with channel profile enhancements and optimizing channel grade, juvenille salmonid rearing and refuge habitat will be greatly improved. Implementation of these measures will influence hydraulic variability, which in turn will self-perpetuate habitat opportunities.

Improving conveyance beneath the parking lot culverts will restore capacity, and together with a reduction in diverted flows to Hartman Pond, will retain cooler flows, improving salmonid habitat throughout the warmer summer months.

The Parking lot stormwater facility will capture runoff from the west end of the Benson Lake parking lot, and onsite treatment will improve water quality in Lower Wahkeena Creek, particularly during storm events.

Lower Multnomah Creek will receive LWD installations and this will create some habitat diversity and morphological variation in the lower reaches of this channel. Gravel augmentation with provide further habitat gains, and the addition of a beaver dam seed structure, provide an opportunity for beavers away from the I-84 culvert.

Riparian plantings throughout the creek restoration area will create a greater degree of native floodplain cover, increase food web production and cycling, and create an increased diversity of terrestrial habitats, in addition to restoration of the natural ecological process of future woody debris recruitment to Lower Wahkeena and Multnomah Creeks.

Management of Diversion Structures to and from Hartman Pond will prioritize cool water flows, and greater discharge in Wahkeena Creek, stimulating the restoration of natural fluvial and biological processes.

FINAL DESIGN NEEDS AND RECOMMENDATIONS

During 30% design development, data needs required to inform final designs were identified. HENDERSON and HERRERA recommend completion of the following tasks:

1. Further survey is required of Lower Wahkeena Creek, Lower Multnomah Creek, and the I-84 culvert.
    a. At the time of the 30% design survey the lower portion of Lower Multnomah Creek, downstream of Sta 2+25 and the lower pedestrian bridge, were not surveyed due to dense stands of blackberry. This vegetation has since been cleared allowing access, enabling the collection of channel and cross section data for final design hydraulic modeling needs.
    b. Channel data for Lower Multnomah Creek between the I-84 culvert and Benson Lake should also be collected at this time to inform final designs.
    c. Survey data is recommended for the downstream (Columbia River) side of the I-84 culvert. Additional survey should be completed for the confluence with the Columbia River to inform future design needs.
2. Additional hydrologic assessment and proposed channel condition hydraulic modeling is recommended for Lower Wahkeena and Multnomah Creeks. Refinement of the project design will involve modifying the hydraulic model to represent proposed conditions. In addition, flow data and water depth measurements should be collected during high flow events for model calibration. Hydraulic conditions at the I-84 Wahkeena Creek culvert need to be investigated to provide boundary conditions for the model, requiring survey of upstream and downstream culvert invert elevations (Herrera, 2012).
3. Engineering calculations developed during the 30% design phase will require updating using results from hydraulic modeling. Calculations will include abutment scour estimates and buoyancy calculations for proposed large wood structures

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APPENDICES A

Herrera Environmental Consultants Memorandum

Lower Wahkeena Creek Habitat Enhancement – Engineering Support

M.Brennan P.E., August 2012

Herrera Environmental Consultants, Inc.

Memorandum

To	Nick Southall, Henderson Land Services
cc	Bruce Henderson, Henderson Environmental Design-Build Professionals
From	Matt Brennan, PE, Herrera Environmental Consultants
Date	August 9, 2012
Subject	Lower Wahkeena Creek Habitat Enhancement – Engineering Support

This memorandum documents hydraulic calculations and geomorphic considerations related to the 30 percent design plans for enhancement of aquatic habitat in lower Wahkeena Creek and lower Multnomah Creek in Multnomah County, Oregon. The design documented herein has been developed by Henderson Environmental Design-Build Services and Herrera Environmental Consultants. The design concept was developed collaboratively between the two firms, and Herrera provided engineering services to support the design.

Lower Wahkeena Creek

Design Objectives

The primary project design objectives are:

- Improve habitat in lower Wahkeena Creek between the Benson State Park access road culvert and the culvert under Interstate 84 (I-84)
- Ensure that the reduced diversion flows to Hartman Pond do not cause increased flooding of the Benson State Park access road

Culvert Conveyance Check

Because sediment has partially filled the twin culverts conveying Wahkeena Creek under the access road to Benson State Park, the project design includes removal of some of this sediment to increase conveyance. The increase in culvert capacity must at a minimum equal the flow capacity lost by blocking the upstream diversion structure to Hartman Pond to prevent any increase in access road flooding potential as a result of this action. To ensure that the project design adequately increases the capacity of the Benson State Park access road culvert, a simplified conveyance calculation was performed.

Existing and proposed conveyance capacity for the 100-year recurrence discharge in the creek was estimated according to *Certification Requirements for Simple Floodway Encroachments* (FEMA 1990). This method is commonly used in open channel flow, but can provide an

approximation of the relative flow conveyance capacity of culverts assuming pipe-full flow. Conveyance (*K*) is defined as:

$$K = \frac{1.486}{n} \times A \times R_h^{2/3}$$

Where:

n = Manning's roughness coefficient (unitless)

A = Channel cross-section area at 100-year recurrence discharge (square feet)

R_h = Hydraulic radius at 100-year recurrence discharge (feet), expressed as:

$$R_h = \frac{A}{P_w}$$

Where:

P_w = Wetted perimeter (feet)

It is important to note that *K* values are not discharge estimates, but a relative measure of capacity that can provide a comparison of conveyance capacity lost at the diversion and gained in the culverts beneath the access road. The 24-inch-diameter corrugated metal culvert in the diversion system has a *K* value of 122, which represents the conveyance capacity lost by blocking the structure. By excavating 6 inches of sediment throughout the length of the Benson State Park access road culverts (dual 6-foot-wide box culverts), *K* is increased by a value of 579, nearly five times the conveyance lost by blocking the diversion. Removing a minimum of 6 inches of sediment from the Benson State Park access road culverts will more than compensate for the increased flow in Wahkeena Creek caused by abandoning the diversion structure.

It is important to note that the conveyance assessment described above assumes that channel bed conditions remain unchanged. Because there is active sediment transport in Wahkeena Creek during extreme discharge conditions, and there is a large amount of sediment stored in the channel upstream of the project reach, it should be assumed that the Benson State Park access road culvert will fill again with sediment. Removal of large quantities of sediment upstream of the culvert and through the upstream railroad bridge opening is out of the scope of the project design. Therefore, culvert cleaning and stream channel grade changes in the project design are short-term measures that are expected to change with extreme storm events.

Lower Wahkeena Creek Channel Grade Design

Lower Wahkeena Creek is a constrained system with respect to plan form layout and channel grade. The upstream and downstream extents of the project reach are fixed by the Benson State Park access road culverts and the I-84 culvert, respectively. At the upstream end, the culverts have been partially filled with sediment deposited in recent extreme runoff events.

Approximately 250 feet of the stream channel downstream of the Benson State Park access road has aggraded with sediment delivered from upstream, leading to an approximate channel slope of 2.5 percent, while the lower 350 feet of the stream channel length within the project reach has a flatter channel grade (approximately 1 percent).

Adjustment of the Wahkeena Creek channel grade is included in the project design to provide a reduced slope in the upper portion of the reach for better fish passage and habitat conditions, and to approximately balance sediment cut and fill in the Benson State Park access road culverts and in the stream channel. A design channel slope of approximately 1.5 percent was used to guide the determination of a new channel grade throughout the reach. Two options for providing this grade were considered:

- Option 1 – Remove 2.5 feet of sediment at the downstream end of the Benson State Park access road culverts and grade the channel extending downstream of the culverts at a slope of 1.5 percent. Removal of sediment from within the culverts would transition from a depth of 2.5 feet at the downstream end to 0.5 feet at the upstream end. This option would involve excavation of much more material than would be placed in the downstream channel, assuming uniform removal of material through the culvert length. This would create 200 feet of channel at the design slope, and would generate approximately 190 cubic yards of excess sediment that would require offsite disposal.

- Option 2 – Remove 1.5 feet of sediment at the downstream end of the Benson State Park access road culverts and grade the channel extending downstream of the culverts at a slope of 1.5 percent. Removal of sediment from within the culvert would transition from a depth of 1.5 feet at the downstream end to 0.5 feet at the upstream end. This option would approximately balance cut and fill (resulting in a net cut of 20 cubic yards), and would provide a greater length of channel at the design slope, approximately 460 feet.

Given the design criteria and balancing the objectives of increasing conveyance in the access road culverts, and optimizing restoration of a 1.5 percent channel grade, Option 2 was selected for 30 percent design development.

As mentioned above in the culvert conveyance discussion, channel grade should be considered a short-term and dynamic design variable. Substantial sediment supply and high channel gradient upstream of the project area suggests that sediment will continue to be delivered to the project reach during extreme events in the future, changing the character of the channel bed within the project reach. Micro-habitat features such as riffles and pools are not proposed in the design because of these dynamic geomorphic conditions. Instead, the proposed design includes channel grade modifications in concert with large wood habitat structures to provide a pilot channel with initial pool and riffle features that can provide both short term and long term habitat diversity benefits by allowing natural channel processes to change the channel form.

Lower Wahkeena Creek Habitat Structure Design

Large wood habitat structures are proposed on alternating banks of the lower Wahkeena Creek channel reach. These structures are intended to provide habitat structure, induce scour pools, sort channel sediment, and provide hydraulic roughness and cover. Each of 9 proposed structures will consist of 4 to 5 key log members which will hold in place smaller wood pieces and slash material. Wood elements include logs with rootwads exposed on the channel bank, logs placed relatively parallel to flow along the bank, and partially buried logs spanning the channel. Bank logs with rootwads would be placed at varying elevations, with most having boles buried into the channel bank for stability. Some of these pieces would be placed on the floodplain surface with the bole braced against existing trees on the upstream end. Bank logs would be partially buried into the channel bank below exposed rootwads.

Placement of woody habitat elements at a range of elevations on the bank, from below the channel bed to the top of bank, is an important element of the project design, as dynamic channel conditions may lead to changing channel bed elevations in the future. These wood habitat structures are designed to provide quality habitat regardless of future channel adjustments in response to sediment deposition in the reach.

Habitat structure stability is based on burial of logs sufficiently to counteract buoyant forces of submerged wood. Pin pile logs will have ends buried into the streambank to a length of 12 feet and a depth of 4 feet at the buried end. Preliminary results of hydraulic modeling at 25-year and 100-year recurrence discharge conditions (described further in the next section) suggests that streamflow could come out of the channel and flow through the adjacent floodplain, but not to a depth that would fully submerge logs placed on the ground surface. For this reason, the design includes placement of wood on the ground surface with rootwads on the streambank. These surface logs could be braced against and between existing trees on the floodplain, or braced against small, low profile pin piles if no trees are present at the design location. This bracing would prevent substantial wood movement towards the I-84 culvert should water levels exceed those predicted.

Hydraulic Model Development

To support preliminary design of the wood habitat structures and the project channel in lower Wahkeena Creek, a simple one-dimensional hydraulic model (created using the HEC-RAS version 4 modeling program) was created for existing channel conditions. Model geometry was developed based on recently surveyed channel cross-sections and LIDAR data. Discharge values used in the model were obtained from the project *Technical Report* (LCREP et al. 2011). The model was used to provide initial estimates of water surface elevations and potential scour depth at structures during large flood events, and can be expanded upon in the future as the project design is developed to provide refined estimates of water surface elevations and stability guidelines for wood structures and proposed channel grading. Collection of discharge measurements and water surface elevations during the 2012-2013 wet season would allow for calibration of model parameters.

Scour depth at bank log habitat structures is estimated at approximately 4 feet during a 25-year storm event based on simplified abutment scour calculations using the Froehlich equation as presented in the *Integrated Streambank Protection Guidelines, Appendix E* (WDFW et al. 2002).

Lower Multnomah Creek

Large wood habitat structures are proposed on the banks of the lower Multnomah Creek channel reach downstream of Benson Lake. Given our current understanding and existing data findings documented in the project *Technical Report* (LCREP et al. 2011), the channel in this reach is oversized and is characterized by low velocity flow. Preliminary habitat structure design for this reach is based on vertical stability to counteract buoyancy due to structure submergence. Like the structures proposed for the lower Wahkeena Creek reach, burial of pin logs to a minimum depth of 4 feet below ground surface will provide stability. Logs can be placed on the ground surface as with the lower Wahkeena Creek structures, however bank geometry may require that such logs are placed at steeper angles toward the active channel.

Detailed Design – Next Steps and Data Needs

Refinement of the project design will involve modifying the hydraulic model to represent proposed conditions. In addition, flow data and water depth measurements should be collected during high flow events for model calibration. Hydraulic conditions at the I-84 Wahkeena Creek culvert need to be investigated to provide boundary conditions for the model, requiring survey of upstream and downstream culvert invert elevations.

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APPENDICES B

From: Todd Alsbury [mailto:todd.alsbury@state.or.us]
Sent: Thursday, October 04, 2012 11:18 AM
To: Chris Collins
Subject: FW: Hartman Pond

Here is a schematic of the standpipe and corresponding outfall structure…also some communication from between our engineer and field staff…

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District Fish Biologist
ODFW-North Willamette Watershed District
17330 SE Evelyn Street
Clackamas, OR 97015
971-673-6011 (office)
503-781-8286 (cell)
971-673-6071 (fax)
todd.alsbury@state.or.us

From: Perry A Baker
Sent: Friday, September 14, 2012 4:22 PM
To: Gary Galovich; Jeff Boechler; Todd Alsbury; Danette Faucera
Subject: RE: Hartman Pond

After our site visit I went to Leaburg Hatchery and talked to them about this project. They were the ones to stock the pond and take care of the pond back in the 80's. Attached is a schematic of the stand pipe. It's difficult to see, but there is a swivel at the bottom pipe connection as we suspected. I now think the swivel is rusted and possibly has a crack in the pipe near the bottom. We defiantly need to get a diver in there to take pictures.

Also, the guys at Leaburg can remember the top being at an angle like it presently is. Could be the creek is so low this year that it cannot supply enough water to keep the pond full. And the standpipe has been leaking for years un-noticed..

From: Gary Galovich
Sent: Friday, September 14, 2012 4:00 PM
To: Jeff Boechler; Todd Alsbury; Danette Faucera
Cc: Perry A Baker
Subject: Hartman Pond

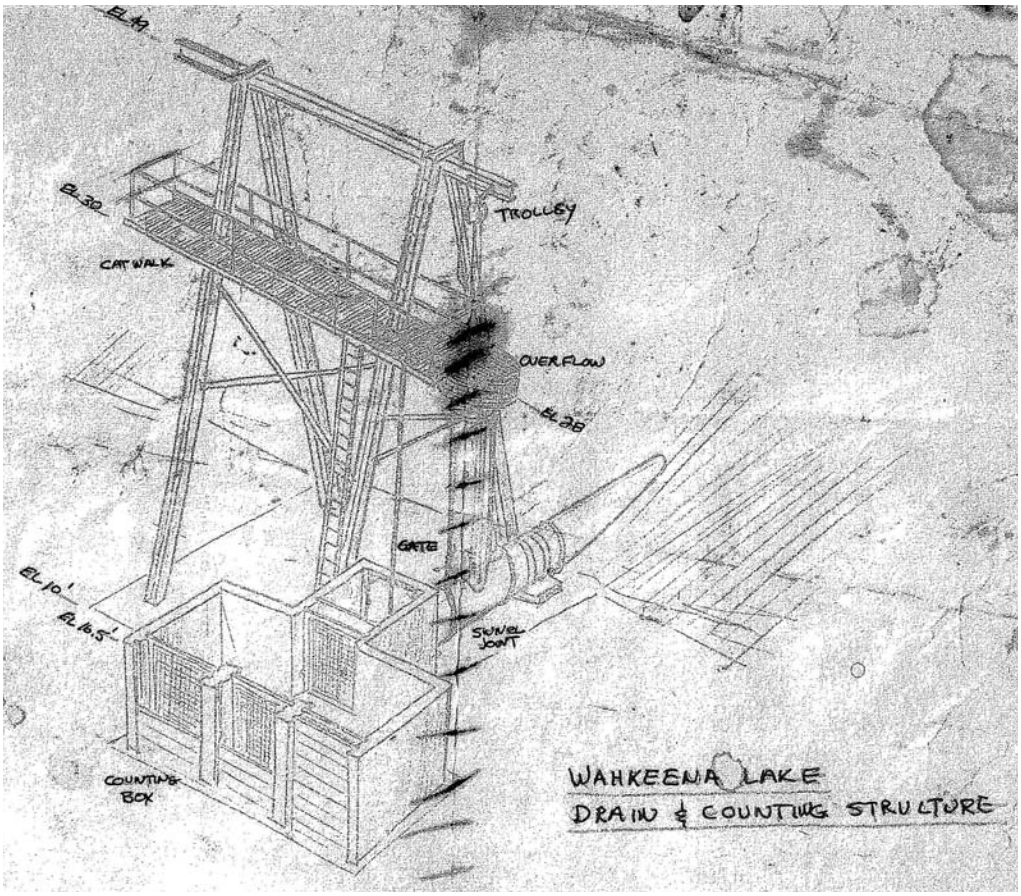
Perry and I visited Hartman today to look at some of the infrastructure concerns expressed by the LCREP folks.We went out to the water control standpipe that the LCREP folks had noted was leaning and it sounds like a fair amount of water is exiting the pipe at the base at or near where it connects with the outflow pipe. The outflow pipe then travels to the shoreline and then passes underneath I84 and out to the Col R. With the pond refilling and until the water elevation reaches the top of the standpipe there should be no water flowing out of the pond.

Lacking any blueprints clearly showing how the control structure functions (Perry will try to locate these) we could only at this time guess. We think it may "just" be a matter of re-fitting the pipe onto the base to stop the leaking. There is a lift and track system in place that will allow for the entire standpipe to be further tilted (the most likely intended scenario) or maybe even slightly lifted – we assumed this is how they drained the pond. Perry thinks it may also be hinged at the base to allow this tilting while making sure it can be accurately placed upright again to stop the flow. However, he doesn't know how it may be hinged and what the condition of the hinge may be. I think he was tempted to push and prod it a bit while we were out there, but my overly-cautious side thought we shouldn't do so in case we couldn't get it back in place – if we couldn't place it again, we might end up draining the pond. With the right equipment in place, we should be able to minimize that risk.

The other concern expressed by LCREP was a separation in the pipe on the downstream side of I84. Perry and I didn't walk to the site today, but based on my description he doesn't think the split is an immediate issue or perhaps in need of repair.

So, in summary, if the standpipe functions like we're guessing, it may not take much to get it upright and closed again as it may now be operating as it's supposed to and is only hinged in a "slightly open" position. The next step will be to get copies of the structure blueprints to confirm this. After that, we feel that if a bottom hinge does exist it should first be inspected before using it. It would probably be best to use a diver to do this. I don't believe staff is allowed to dive for the Department anymore, so we would need to bring someone in.

Gary Galovich
Western Oregon Warmwater Fish Biologist
Oregon Department of Fish and Wildlife
South Willamette Watershed District Office
7118 NE Vandenberg Ave
Corvallis OR 97330
541-757-5244
Gary.M.Galovich@state.or.us



Attachment 3 – Hartman Pond Water Budget Memorandum
Multnomah and Wahkeena Creek Restoration Project – Phase I

Lower Columbia Estuary Partnership

MEMORANDUM

Date: May 14, 2013

To: Andrea Berkley, OPRD
Todd Alsbury, ODFW
Mark Kreiter, USFS
From: Chris Collins and Paul Kolp, Lower Columbia Estuary Partnership

Re: Hartman Pond Water Budget and Wahkeena Creek Temperature Monitoring

The Lower Columbia Estuary Partnership (Estuary Partnership), OPRD, USFS, and ODFW (collectively referred to as the project team) are investigating potential enhancement actions on Multnomah and Wahkeena Creeks, located at Benson State Recreation Area in the Columbia River Gorge. The Estuary Partnership completed a baseline assessment and alternatives analysis in 2011 that identified the site's limiting factors and proposed restoration and enhancement alternatives to address those limiting factors (Estuary Partnership 2011). The objective of this memorandum is to summarize subsequent field investigations conducted at the project site during 2012. The project team will use results of the 2012 investigations to further evaluate the site's limiting factors and enhancement alternatives and to inform project designs.

Several anthropogenic impacts have occurred at the site, including rerouting of streams and creation of two freshwater ponds during construction of Interstate-84 in the mid-1900s (I-84) (Christy 2010). Figure 1 includes 1935 and 2004 aerial photographs that compare site conditions pre- and post-development. One of the impacts to Wahkeena Creek (a second-order, spring-fed stream with stable baseflow and temperatures; see Table 1) is the diversion of a portion of its surface flow into Hartman Pond, a warm-water fishery located to the west of the stream. Based on discharge measurements taken by the Estuary Partnership in 2010 and 2011, approximately 40% of Wahkeena Creek's baseflow is diverted into Hartman Pond[1]. Because Wahkeena Creek flows into lower Multnomah Creek (Figure 1), which has approximately four acres of relatively high quality off-channel rearing habitat at its confluence with the Columbia River but also elevated temperatures during summer months (due to its diversion through Benson Lake), the project team seeks to improve Multnomah Creek's water quality by increasing Wahkeena Creek's instream flow. Lower Multnomah Creek also has other water quality issues, e.g., algae blooms, that likely would be improved by increased discharge/dilution from Wahkeena Creek.

This memorandum summarizes two investigations conducted by the Estuary Partnership. The first investigation was designed to quantify the exact diversion rate required to maintain year-round water levels in Hartman Pond. The second investigation was designed to quantify the benefits of increased flows in Wahkeena Creek to stream temperatures in lower Multnomah Creek (downstream/north of I-84).

[1] 1.8 of 4.4 cfs was being diverted on 9/15/10; 2.1 of 5.6 cfs was being diverted on 7/27/11.

Table 1. Wahkeena Creek Discharge and Temperature at Upstream Project Boundary

Discharge		Temperature	
Date	**Q**	**Year**	**Highest 7-day Avg. Max. Temp.**
9/15/2010	4.4 cfs	2010	11.4˚C
7/27/2011	5.6 cfs	2011	11.6˚C
7/11/2012	5.6 cfs	2012	11.9˚C
8/1/2012	5.6 cfs		
9/12/2012	4.5 cfs		
10/11/2012	4.6 cfs		

Notes: (1) All discharge measurements taken before appreciable fall rain occurred.
(2) cfs = cubic feet per second

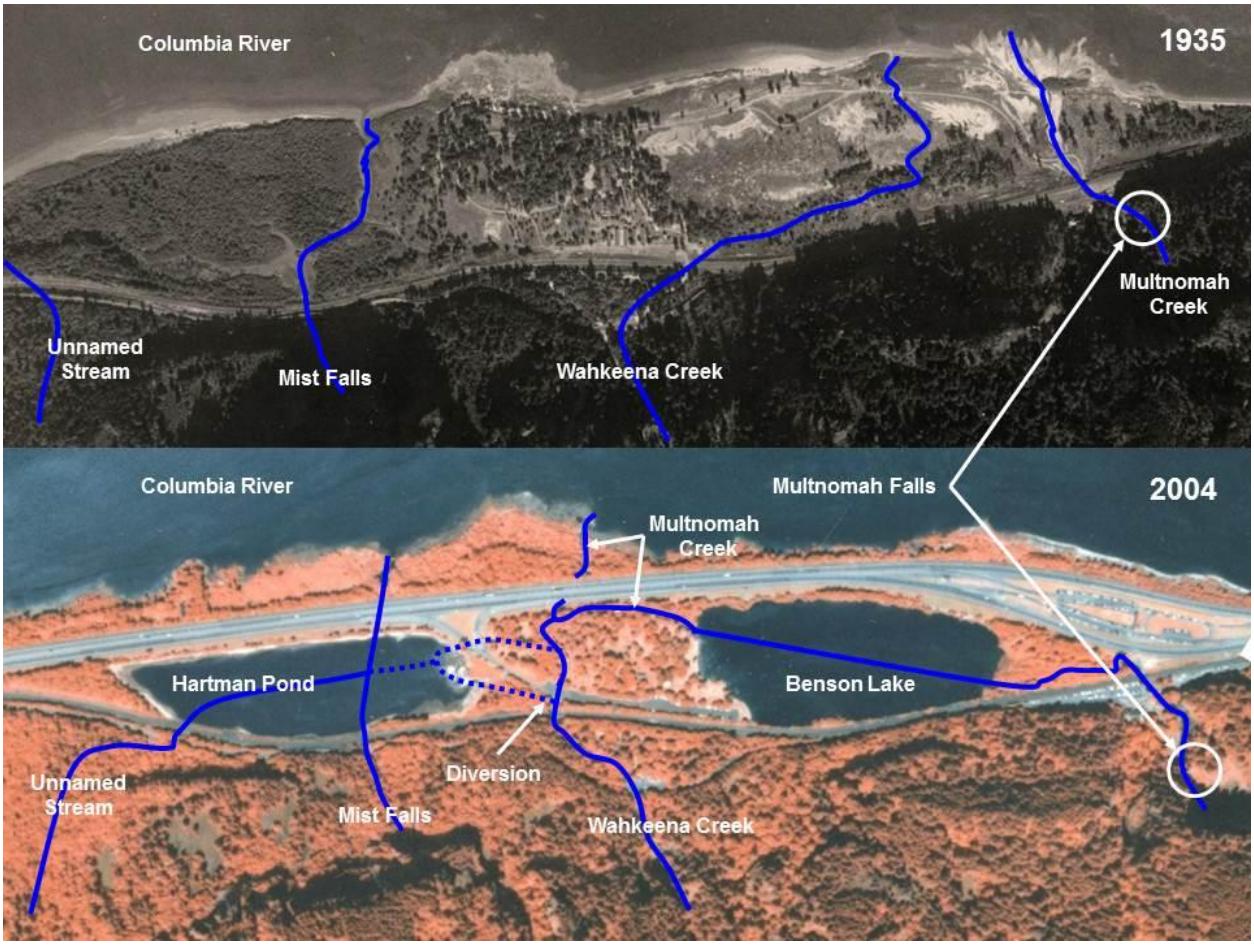


Figure 1. Historic aerial photographs.

Hartman Pond Water Budget:

Despite the project team's desire to improve Multnomah Creek water quality, OPRD, ODFW, and the Estuary Partnership are committed to maintaining recreational fishing opportunities in Hartman Pond. In order to maintain the current conditions in Hartman Pond, the Estuary Partnership established the following criteria:

1. Minimal decrease (less than 12-18 inches) in Hartman Pond surface water levels during peak fishing months, i.e., May through October; and,
2. Sufficient water quality to maintain a warmwater sport fishery.

In order to estimate the diversion rate required to meet the above criteria, the Estuary Partnership developed a water budget to estimate Hartman Pond's rate of water loss during peak fishing months, which corresponds with the time period when hydrologic inputs (precipitation and surface water runoff) to the pond are lowest.

The Estuary Partnership developed the water budget using the following mass balance equation:

$$P + I_s + I_g - E - O_s - O_g = \Delta V \qquad [1]$$

Where: P = precipitation

I_s = surface water inputs;

I_g = groundwater inputs;

E = evaporation;

O_s = surface water outputs;

O_g = groundwater outputs; and

ΔV = the change in volume.

Figure 2 below shows a conceptual model of the mass balance equation (1) from above.

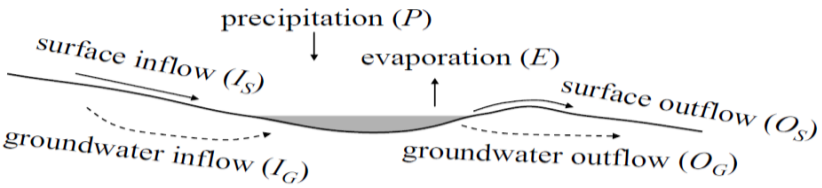


Figure 2. Inputs and outputs related to lake water balance (Hayashi 2006).

By rearranging equation 1, we can solve for net groundwater gain/loss to determine the net amount that is entering or leaving the system:

$$I_g - O_g = \Delta V - P + E + Is + Os \qquad [2]$$

Data sources for the above variables are as follows:

- Precipitation – real-time gage data from the Washougal Climate Station WB7UVH (http://www.findu.com/cgi-bin/wxpage.cgi?call=WB7UVH&last=120).
- Surface water inputs – measured once per month at the two known tributaries (diversion channel and Mist Falls) from June through October 2012. Discharge estimates within the diversion channel were calculated by measuring velocities at multiple locations across a fixed cross-section. Discharge at the

Mist Falls outlet was estimated by measuring the amount of time required to fill a 5-gallon bucket and converting gallons per second to cubic feet per second.

- Groundwater inputs – no data available.
- Evaporation – historic pan evaporation data from 1928-2005 from Hood River Experimental Station (WRCC- http://www.wrcc.dri.edu/htmlfiles/westevap.final.html).
- Surface water outputs – visually observed at the lake's two outlets.
- Groundwater outputs – no data available.
- Pond volume – calculated by combining two data sources:
    - water surface elevations – measured using Hobo Onset data loggers deployed from 5/30/2012 to 10/9/2012; and,
    - contour data – developed from a bathymetry survey conducted on 6/27/2012 (Figure 3) during which the Estuary Partnership used a stadia rod to measure water depths at 152 points along 15 cross-sections (sample locations marked with an Ashtech Promark 100 L1 GPS receiver).

Figure 3. Hartman Pond bathymetry survey results. All depths relative to water surface elevation on date of survey (June 27, 2012).

To reduce error and uncertainty, the Estuary Partnership solved equation 2 only for time periods when the following conditions occurred for a minimum of three consecutive weeks:

- precipitation equaled 0.0 inches;
- surface water inputs from Mist Falls equaled 0.0 cfs; and,
- surface water outputs equaled 0.0 cfs.

Fortunately, 2012 was a dry summer, and the above conditions persisted from July 10 through October 9. The Estuary Partnership used the following data and assumptions during this period:

- Precipitation – set to match 2012 precipitation data (zero precipitation from July 4, 2012 through Oct. 9, 2012);
- Evaporation – monthly rates reported by Hood River Experimental Station; to generate a conservative estimate, rates for September were set to equal August to mimic the "hotter/drier-than-average" September experienced in 2012; assumes evaporation rates from Hood River approximate those at Hartman Pond.
- Surface water inputs – set to match 2012 field measurements.
    - Diversion channel = 0.4 cfs. This value was measured during all dry period measurements (early July through early October), except October when it increased to 0.5 cfs.
    - Mist Falls and unnamed tributary = 0.0 cfs from July 10 through October 9.
- Surface water outputs – observed to be 0.0 cfs from July 4 through October 9, except for a leak in Hartman Pond's standpipe outlet, which was detected in late August. We were unable to quantify the rate of loss in the field. ODFW repaired the standpipe in early September.
- Pond volume - using bathymetry data (Figure 3) and available LiDAR, we created a triangulated irregular network (TIN) allowing for lake bed elevations to be determined at any point within Hartman Pond. Based on the TIN model and water surface elevations collected using continuously deployed water level data loggers, we were able to calculate pond volume (and therefore change in volume) over the entire sampling period.

Detection of the standpipe's leak, our inability to quantify its rate of loss in the field, and ODFW's repair of the structure complicated our study. To account for this, we solved equation 2 for two time periods:

- August 1 – August 31, 2012: This period represents the highest rate of loss in pond volume and is used to represent the worst-case scenario.
- September 17 – October 9, 2012: This represents the period during which the rate of loss "flattened", presumably due to ODFW's repair of the leaking standpipe outlet structure and to a lesser extent, reduced evaporation rates.

Results for the above time periods are as follows:

- For August 2012, groundwater loss was approximately 0.9 cfs; if evaporation is added the total loss is estimated at 1.1cfs (Figure 4). It should be noted however that during this period, the standpipe outlet structure was leaking undetected. *This leakage is included in the estimated groundwater loss of 0.9cfs.*
- For September 17 – October 9**,** groundwater loss was approximately 0.5 cfs, and total loss was 0.7 cfs (Figure 4). ODFW repaired the standpipe in early September, therefore the decrease in groundwater loss (0.4 cfs) is presumed to be due primarily to that repair.
- Based on visual observations, temperature monitoring in Hartman Pond, and conversations with fishermen, water quality conditions did not appear to be limiting for Hartman Pond's warmwater fishery during either time period.

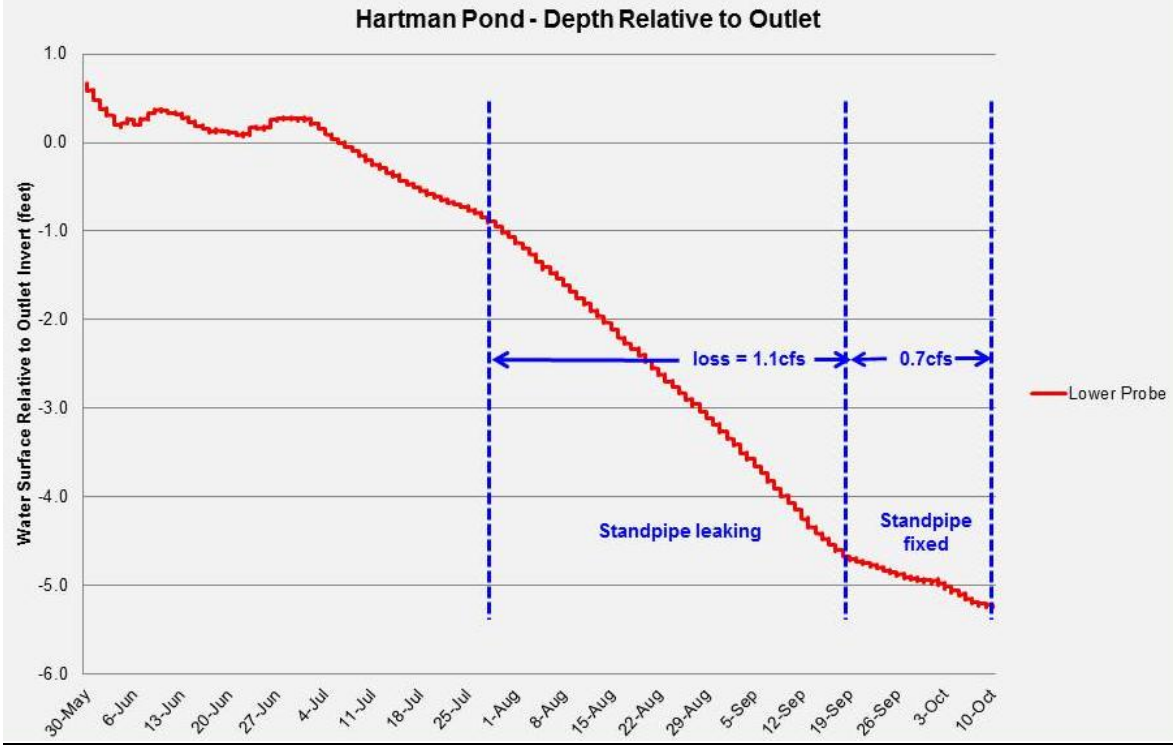


Figure 4. Hartman Pond stage monitoring results

Stream Temperature Monitoring:

As noted previously, one of the project's primary goals is to improve water quality in lower Multnomah Creek, as indicated by summer water temperatures. This is important not only to salmonids that spawn and rear in Multnomah and Wahkeena Creeks, but also to juveniles from upriver stocks, many of which outmigrate through the lower river during summer and fall months when mainstem Columbia River water temperatures at Bonneville Dam typically range from 18˚C to 22˚C (Keefer et al., 2011). Such temperatures are stressful to juvenile salmonids, likely queuing them to seek thermal refugia in cooler tributary habitats, such as those that existed at the site prior to development.

Table 2 and Figure 5 summarize stream temperature monitoring results at the project site. These results indicate that although temperatures are similar at three of the four monitoring stations during all three years, temperatures in lower Multnomah Creek (downstream/north of I-84) were cooler in 2012 when Hartman Pond was diverting approximately 10 percent of Wahkeena Creek's baseflow, as compared to 2006 and 2010 when approximately 40 percent was diverted[2]. Based on these results, the increased flow in Wahkeena Creek during 2012 decreased peak summer temperatures in lower Multnomah Creek by approximately 3˚C. More importantly, this decrease in temperature brought the lower portion of Multnomah Creek into compliance with Oregon Department of Environmental Quality (DEQ) temperature standards for juvenile salmonid rearing habitat (maximum 7-day average maximum temperature of 18˚C) and established a thermal regime that is well below the 19˚C threshold for smallmouth bass (*Micropterus dolomieu*), the non-native predator with the highest tolerance for cool water temperatures (Moyle 2002).

[2] Lower Multnomah Creek temperatures in 2006 are similar to 2010 when the diversion rate is assumed to also be approximately 40% (according to OPRD staff, the diversion gate had not been actively maintained since the 1996 flood).

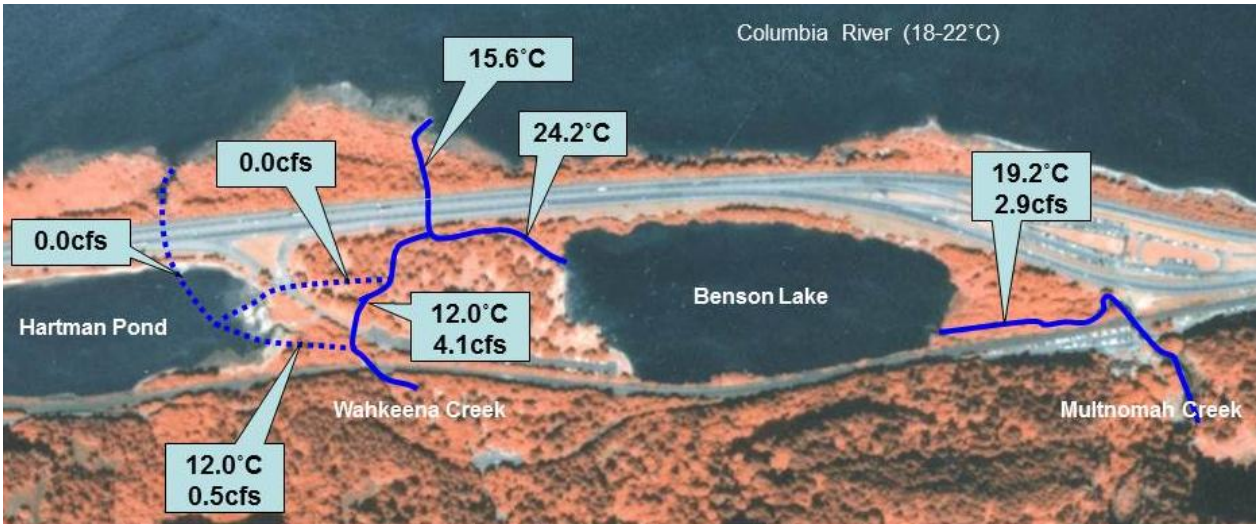


Figure 5. 2012 temperature monitoring results. Temperatures reported are the highest seven day average maximum temperatures observed during 2012. Discharge values reported were taken on October 11, 2012, and due to abnormally dry conditions, represent the lowest flows reasonably expected to occur.

Table 2: Temperature Data for Wahkeena and Multnomah Creeks

		Stream Temperature Monitoring Station			
Year	**Percentage of Wahkeena Q Diverted**	**Wahkeena[a]**	**Multnomah (u/s of lake) [a]**	**Multnomah (d/s of lake)**	**Multnomah (d/s of I-84)**
2006[b]	~40% (assumed)	13.0˚C	Not available	27.1˚C	18.9˚C
2010	~40%	11.4˚C[c]	17.8˚C[c]	24.1˚C[c]	18.3˚C[b]
2012[c]	~10%	12.0˚C	19.2˚C	24.2˚C	15.6˚C

Notes: Reported temperatures are the highest 7-day average maximum temperature observed.
[a]Based on our discharge measurements, Multnomah Creek's low-flow discharge averages 3.7cfs above Benson Lake, and Wahkeena Creek's low-flow discharge averages 5.1cfs.
[b]Temperature data collected by USFS.
[c]Temperature data collected by Estuary Partnership.

We used the following weighted average equation to estimate temperatures in lower Multnomah Creek should the Hartman Pond diversion be set at the replacement rate identified earlier in this memorandum (0.7cfs).

$$T_r = ((T_M * Q_M) + (T_W * Q_W)) / Q_{M+W} \qquad [3]$$

Where: T_r = temperature in lower Multnomah Creek (d/s of I-84)
T_M = temperature in Multnomah Creek u/s of I-84
Q_M = discharge in Multnomah Creek u/s of I-84
T_W = temperature in Wahkeena Creek u/s of I-84
Q_W = discharge in Wahkeena Creek u/s of I-84
Q_{M+W} = combined discharge of Multnomah and Wahkeena Creeks

We ran this equation using available data to assess its effectiveness at predicting temperatures in lower Multnomah Creek. Table 3 presents the results of that exercise. Based on these results, the weighted average approach appears to have limited utility in predicting temperatures in lower Multnomah Creek. However,

based on the slight increase in diversion rate (as compared to 2012's rate of 0.4 cfs), temperatures in lower Multnomah Creek are anticipated to rise only slightly if the diversion is set at 0.7cfs, and certainly would be closer to temperatures observed in 2012 than those observed in 2006 and 2010.

Table 3. Predicted and observed temperatures in lower Multnomah Creek.

Year	Predicted Temperature	Observed Temperature	Difference
2006	20.8˚C	18.9˚C	1.9˚C
2010	18.4˚C	18.3˚C	0.1˚C
2012	17.4˚C	15.6˚C	1.8˚C
2013[a]	17.6˚C	TBD	TBD

Notes: [a]Temperatures at the other three monitoring stations assumed to be the same as those observed in 2012.

The Estuary Partnership will conduct temperature monitoring during summer 2013 to more accurately estimate post-restoration conditions.

Discussion:

This analysis does not indicate the direction of groundwater flow; however, it provides an estimate of the net rate of Hartman Pond's groundwater gain/loss during low-flow months (July – September). It also estimates the rate of loss attributable to evaporation and the faulty standpipe outlet structure.

Results indicate that groundwater loss was fairly constant at 0.5cfs throughout the study period (mid-July through early October 2012). Evaporation averaged 0.2cfs, providing a total loss of approximately 0.7 cfs during low flow months. Comparing results before and after ODFW's repair of the standpipe outlet structure indicates that approximately 0.4cfs was being lost through that structure's leak(s), i.e., total loss was 1.1cfs prior to repair of the standpipe and 0.7cfs after repairs were completed.

Study results suggest that the diversion rate required to maintain water levels in the Hartman Pond fishery during low-flow months is approximately one-third of the amount that was previously diverted (0.7cfs estimated replacement rate vs. ~2.0cfs previously diverted). The repairs to the Hartman Pond standpipe outlet structure allowed this replacement rate to decrease from 1.1cfs to 0.7cfs, a 35% reduction that will be critical to maintain to realize the greatest possible benefits of the project.

Although it is difficult to predict post-restoration temperatures in lower Multnomah Creek, results from three years of temperature monitoring indicate that post-restoration temperatures in lower Multnomah Creek may be 2-3˚C lower than those observed in 2006 and 2010. At a minimum, summer temperatures at the mouth of Multnomah Creek are anticipated to be below the 18˚C threshold established by DEQ for salmonid rearing habitat in the state or Oregon, therefore providing water quality that is suitable for juvenile salmonid rearing throughout the year.

Before implementing the project, the Estuary Partnership will test the ability of the 0.7cfs diversion rate to maintain water levels in Hartman Pond and improve water quality conditions in lower Multnomah Creek. That trial (and associated monitoring) will occur during summer and fall 2013.

References:

Christy, John A. 2010. Interpretation of General Land Office land survey notes for bottomlands at Benson State Park, Multnomah County, Oregon.

Estuary Partnership, U.S. Forest Service, and Henderson Land Services. 2011. Technical Report – Multnomah and Wahkeena Creek Restoration Project Feasibility and Alternatives Analysis. May 2011.

Hayashi, Masaki. 2006. Lecture – Mass Balance of Lakes and Wetlands. Accessed on-line at http://people.ucalgary.ca/~hayashi/geog515/lectures.htm on April 2, 2012. University of Calgary, Calgary, Alberta, Canada.

Keefer, Matthew, Chris Caudill, and Chris Peery. 2011. Memorandum to USACE Portland District re: temperature regimes during upstream migration and the use of thermal refugia by adult salmon and steelhead in the Columbia River basin. December 15, 2011.

Moyle P.B. 2002. Inland Fishes of California. Second Edition. University of California Press, Berkeley, California, USA.

Attachment 4 – Sample Contract

Multnomah and Wahkeena Creek Restoration Project – Phase I

CONTRACT No. xx-20xx

CONTRACTOR[1] **("Contractor")**	**Lower Columbia Estuary Partnership ("Estuary Partnership")**
Organization**:** Project Officer: Title: Address**:** Phone**:** Fax: E-mail: **Citizenship**, if applicable**:** Non-resident alien **[ ]** Yes **[ ]** No **Business Designation** (check one): **[ ]** Corporation **[ ]** Partnership **[ ]** Limited Partnership **[ ]** Limited Liability Company **[ ]** Limited Liability Partnership **[ ]** Sole Proprietorship **[ ]** Other **Tax ID# _____** **Certified Minority, Women or Emerging Small Business Firm? [ ]** No **[ ]** Yes **Number: _____**	Project Officer: Debrah Marriott Title: Executive Director Address: Lower Columbia Estuary Partnership 811 SW Naito Parkway, Suite 410 Portland, OR 97204 Phone: (503) 226-1565 x227 Fax: (503) 226-1580 E-mail: dmarriott@estuarypartnership.org Finance Manager: Tom Argent Phone: (503) 226-1565 x242

This Contract is between the **Lower Columbia River Estuary Partnership** ("**Estuary Partnership**"), an Oregon nonprofit corporation, and _____ **("Contractor")**.

TERMS & CONDITIONS

1. **Effective Date and Duration.** This Contract shall become effective on the date it has been signed by Estuary Partnership. Unless terminated or extended, this Contract shall expire when Estuary Partnership accepts Contractor's completed performance. Expiration or termination shall not extinguish or prejudice Estuary Partnership's right to enforce this Contract with respect to any breach of a Contractor warranty or any default or defect in Contractor performance that has not been cured.

2. **Statement of Work**. The Statement of Work (the "Work"), including the delivery schedule for such Work, is contained in Exhibit A. Contractor agrees to perform the Work in accordance with this Contract.

3. **Damages for Delay.** Owner and Contactor recognize that time is of the essence for this Contract and that Estuary Partnership will suffer financial loss if the Work is not completed within the times specified in Exhibit

[1] *Information in the Contractor Block must be provided prior to Contract approval. This information shall be reported to the Internal Revenue Service (IRS) under the name and taxpayer identification submitted. (See IRS 1099 or 1099-MISC for additional instructions regarding taxpayer ID numbers.) Information not matching IRS records could subject Contractor to 31 percent backup withholding.*

A. Contractor shall pay to Estuary Partnership liquidated damages in the amount of $250.00 (two hundred fifty dollars) per day for every day after August 1, 2014 that the Work is not completed and ready for final payment.

4. **Contract Documents**. This Contract includes the attached Exhibits A through F, each of which is incorporated by this reference.

5. **Contractor's Representations**

Contractor has examined and carefully studied the Request for Proposal (RFP) and other related data identified in the RFP documents.

Contractor has visited the site and become familiar with and is satisfied as to the general, local, and site conditions that may affect cost, progress, and performance of the Work.

Contractor is familiar with and is satisfied as to all federal, state, and local laws and regulatory permit conditions and other miscellaneous conditions of work that may affect cost, progress, and performance of the Work.

Contractor is aware that funding for this project is provided by a variety of funders, and that such funders may impose certain employment and contracting requirements on contractors and subcontractors benefitting from these funds. Contractor agrees to abide by these and all other applicable laws, regulations, and procedures, and to require its subcontractors, if any, to abide by these laws, regulations, and procedures.

Contractor agrees to employ or otherwise hire only persons eligible to work in the United States and to comply with prevailing wage rates, as required by federal and/or state law. Further, Contractor agrees that it shall complete "Indemnity Agreement for Third Party Contractors" as a requirement for entering into this Agreement. Contractor agrees that it shall complete this form on the same day it signs this Agreement.

Contractor has obtained and carefully studied (or assumes responsibility for having done so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site that may affect cost, progress, or performance of the Work or that relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor.

Contractor has correlated the information known to Contractor, information and observations obtained from visits to the site, reports and drawings identified in the RFP, and all additional examinations, investigations, explorations, tests, studies, and data with the RFP.

Contractor has given Estuary Partnership written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the RFP, if any, and the written resolution thereof by Estuary Partnership is acceptable to Contractor.

6. **Amendments.** No Term or Condition of this Contract, including the Work, shall be amended without review and written consent by Estuary Partnership. Such amendment shall be made through a formal written amendment, executed by both parties prior to the amendment being implemented.

There may be a one-time budget adjustment of less than 10% of Project Total, set forth in Exhibit B, per contract period, provided that Estuary Partnership receives documentation of and approves in writing the change prior to the adjustment. For consideration, Contractor's written request for change or amendment must be received by Estuary Partnership at least thirty (30) calendar days before the task deliverable or final report is due as set forth in the Statement of Work.

7. **Payments and Consideration.**
   a) Estuary Partnership agrees to pay Contractor as stipulated in Exhibits A and B for accomplishing the Work.
   b) **Invoicing.** For review and approval by Estuary Partnership, Contractor shall submit an invoice not more often than every fifteen (15) days. It shall itemize and explain all expenses for which reimbursement is claimed pursuant to Exhibits A and B, including itemization of any cost share expended. Invoices must be submitted within 30 days after the completion of the work being billed. Each invoice shall include:
      i. Name, mailing address and phone number of Contractor
      ii. Estuary Partnership contract number, invoice date and number
      iii. Performance period
      iv. Itemized expenses by task and budget line (including units and unit cost, where applicable) as prescribed in Exhibit A and Exhibit B
      v. Contract financial summary outlining the total amount of the approved contract budget, accumulative funds requested and the funds remaining in this Contract at the time the invoice is submitted

   Contractor shall send invoices and all deliverables to the **Finance Manager**, **Lower Columbia Estuary Partnership, 811 SW Naito Parkway, Suite 410, Portland, OR 97204**

   c) **Disbursement.** If Estuary Partnership finds the invoice documentation is in accordance with requirements of this Contract and if Estuary Partnership accepts the completed work, Estuary Partnership shall disburse the payment to Contractor within forty-five (45) calendar days of acceptance. If Estuary Partnership determines that Contractor modified the Work without prior written approval or if the Work is otherwise unacceptable in Estuary Partnership's reasonable judgment, Estuary Partnership is not be obligated to disburse the payment. If Estuary Partnership elects not to disburse the payment, Estuary Partnership shall notify Contractor in writing of the reason for nonpayment. Estuary Partnership may allow Contractor a reasonable time to address Estuary Partnership's reason for nonpayment, and to resubmit a new invoice.

   d) **Excess or Untimely Invoices**. Contractor shall not submit invoices for, and Estuary Partnership shall not pay, any amount in excess of the Maximum Award defined in Exhibit A and B. If Estuary Partnership increases the Maximum Award by amendment, the amendment must be fully effective before Contractor performs work subject to the amendment. No payment shall be made for activities performed before the Begin Date or after the End Date, regardless of the relationship of the activity performed to this Contract.

8. **Reports**. Contractor shall prepare and submit all interim progress reports and a final report in accordance with Statement of Work. Contractor agrees to use recycled paper for all reports prepared in accordance with the Statement of Work and to print documents on both sides of paper, unless otherwise stipulated.

9. **Publicity, Release of Information and Work Citation**. Contractor shall not hold press conferences, issue press releases, or otherwise make public statements regarding this Contract or the Work, release reports or make presentations without prior review and written approval from Estuary Partnership. Any such activities as approved by Estuary Partnership shall require the Contractor to indicate that the Work was made possible by Estuary Partnership.

10. **Termination for Convenience**. Estuary Partnership, in its sole discretion, may terminate this Contract, in whole or in part, upon 30 days' prior notice to Contractor.

11. **Termination for Cause – Estuary Partnership**. Estuary Partnership may terminate this Contract, in whole or in part, effective immediately upon notice to Contractor, or at such later date as Estuary Partnership may establish in such notice, upon the occurrence of any of the following events:
    a) **Funding**. Estuary Partnership fails to receive funding, or appropriations, limitations or other expenditure authority at levels sufficient, in its sole judgment, to pay for Contractor's Work;

b) **Laws Modified**. Applicable laws, regulations or guidelines are modified or interpreted in such a way that either the Work is prohibited or of less value, or Estuary Partnership is prohibited from paying for such Work from the planned funding source;

c) **License**. Contractor no longer holds necessary license or certificate that is required to perform the Work; or

d) **Contractor Failure**. Contractor commits any material breach or default of any covenant, warranty, obligation or agreement under this Terms & Conditions, fails to perform the Work within the time specified in the Statement of Work or any extension thereof, or fails to pursue the Work as to endanger Contractor's performance in accordance with the Statement of Work, and Contractor fails to address the breach or default within 10 days of notice, or such other time as specified by Estuary Partnership in such notice.

e) **Site Conditions**. Conditions at the site (or surrounding area) change to the degree that the project is no longer beneficial to implement or benefits realized do not justify the costs required to implement the project.

12. **Termination for Cause – Contractor**. The Contractor may terminate this Contract, in whole or in part, effective upon 60 days' prior written notice to Estuary Partnership if Estuary Partnership commits any material breach or default of any covenant, warranty, obligation or agreement under the terms and conditions of this Contract and Estuary Partnership fails to address the breach or default within 10 days of notice, or such longer time as specified by Contractor in such notice.

13. **Remedies**.

a) **Contractor Remedies**. Contractor's sole and exclusive remedy shall be a claim for the sum designated for accomplishing the Work multiplied by the percentage of Work completed and accepted by Estuary Partnership pursuant to Section 5, less previous amounts paid and any claim(s) which Estuary Partnership has against Contractor. If previous amounts paid to Contractor exceed the amount due to Contractor under this subsection, Contractor shall promptly pay any excess to Estuary Partnership upon demand.

b) **Estuary Partnership Remedies**. In the event of termination pursuant to Section 11, without limitation, Estuary Partnership shall have any remedy available to it in law or equity. If it is determined for any reason that Contractor was not in default under Section 9, the rights and obligations of the parties shall be the same as if this Contract was terminated pursuant to Section 10.

c) **Contractor's Tender Upon Termination**. Upon receiving a notice of termination of this Contract, Contractor shall immediately cease all activities under this Contract, unless Estuary Partnership expressly directs otherwise in such notice of termination. Upon termination of this Contract or at the Estuary Partnership request, Contractor shall deliver to Estuary Partnership all documents, information, research, objects or other tangible components, works-in-progress and other property that are or would be deliverables had the Work been completed.

14. Records. Contractor shall maintain all fiscal records relating to this Contract in accordance with generally accepted accounting principles. In addition, Contractor shall maintain any other records pertinent to this Contract in such a manner as to clearly document Contractor's performance. Contractor acknowledges and agrees that Estuary Partnership and its duly authorized representatives shall have access to such fiscal records and other books, documents, papers, plans and writings of Contractor to perform examinations and audits and make excerpts and transcripts. Contractor shall retain and keep accessible all such fiscal records, books, documents, papers, plans, and writings for a minimum of three (3) years, or such longer period as may be required by applicable law, following final payment or other termination of this Contract, whichever date is later.

15. **Lobbying and Litigation**. Contractor agrees not to use this Contract to engage in lobbying the Federal Government or litigation against the United States.

16. **Relationship of Parties**. Contractor and Estuary Partnership acknowledge and understand that (i) neither Estuary Partnership nor Contractor is the agent or partner of the other; (ii) this Contract shall not be construed as creating a joint venture between Estuary Partnership and Contractor; (iii) neither Estuary Partnership nor

Contractor shall be responsible for the debts or obligations of the other; and (iv) neither Estuary Partnership nor Contractor has the authority to bind or act on behalf of the other.

17. **Indemnity**. Contractor shall defend, hold harmless, and indemnify Estuary Partnership and its officers, directors, members, employees, agents, and other representatives from and against all claims, suits, actions, losses, damages, liabilities, costs, and expenses arising out of the acts of the Contractor and its officers, employees, contractors, agents, or other representatives in performing the Exhibit A Work. With respect to any of Contractor's professional services rendered in performing the Exhibit A work, these Section 17 Indemnity provisions shall apply only to the negligent acts of the Contractor and its officers, employees, contractors, agents, or other representatives.

18. **Confidentiality and Proprietary Information**. Contractor shall use "Confidential Information," as defined herein, only to perform the Work. Contractor, its employees and agents, shall not in any manner disclose Confidential Information except for the sharing of such information with its employees or agents (a) who require such information in conjunction with the performance of the Work (b) who agree in writing to be bound by the restrictions of this Section, and (c) for whose conduct Contractor shall be strictly responsible. Contractor shall maintain all Confidential Information in strict confidence and shall take all reasonable precautions to ensure that Confidential Information is not willfully or inadvertently disclosed by it or any of its employees or agents in a manner contrary to this Agreement. In no event shall Contractor or any of its employees or agents use any of the Confidential Information for personal benefit, to the detriment of the Estuary Partnership, to aid in the business of any rival concern or entity or for any purpose other than performing the Work. Notwithstanding the foregoing, Contractor may disclose Confidential Information to a governmental agency or regulatory body to the extent that disclosure is required by law, court order, or subpoena, provided that Contractor shall notify Estuary Partnership promptly after Contractor is notified that disclosure is required.

    "Confidential Information" is all of Estuary Partnership's business and operational plans; budgets; grant writing, grant application strategies and the results of research about funding sources; work plans and papers; work products; funding sources; contacts; specifications; strategies; methodologies; techniques; financial statements and projections; information that Estuary Partnership is legally or contractually obligated to keep confidential; and any other information that Estuary Partnership, in its reasonable discretion, considers to be confidential, proprietary or sensitive; in all instances regardless of whether such information is disclosed orally or in written or electronic form or is derived or prepared by Contractor.[2]

19. **Attorney Fees.** With respect to any dispute relating to this Contract, or in the event that a suit, action, arbitration, or other proceeding of any nature whatsoever is instituted to interpret or enforce the provisions of this Agreement, including, without limitation, any proceeding under the U.S. Bankruptcy Code and involving issues peculiar to federal bankruptcy law or any action, suit, arbitration, or proceeding seeking a declaration of rights or rescission, the prevailing party shall be entitled to recover from the losing party its reasonable attorney fees, paralegal fees, expert fees, and all other fees, costs, and expenses actually incurred and reasonably necessary in connection therewith, as determined by the judge or arbitrator at trial, arbitration, or other proceeding, or on any appeal or review, in addition to all other amounts provided by law.

20. **Governing Law**. This Contract is governed by and construed in accordance with the laws of the State of Oregon without regard to principles of conflicts of law. Any claim, action, suit or proceeding relating to this Contract (collectively, a "Claim") shall be brought and conducted solely and exclusively within the Circuit Court of Multnomah County for the State of Oregon; provided, however, if a Claim must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District

[2] *Ownership of work product is addressed in Exhibit A. To the extent Contractor co-owns work product, the rights and obligations set forth in this Section shall be interpreted to be consistent with such co-ownership.*

Court for the District of Oregon. CONTRACTOR, BY EXECUTION OF THIS CONTRACT, HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF SAID COURTS.

21. **Independent Contractor; Responsibility for Taxes and Withholding**
    a) Contractor shall perform all required Work as an independent contractor. Although Estuary Partnership reserves the right (i) to determine (and modify) the delivery schedule for the Work to be performed, and (ii) to evaluate the quality of the completed performance, Estuary Partnership cannot and shall not control the means or manner of Contractor's performance. Contractor is responsible for determining the appropriate means and manner of performing the Work.
    b) Contractor shall be responsible for all federal, state or other taxes applicable to compensation or payments paid to Contractor under this Contract and, unless Contractor is subject to backup withholding, Estuary Partnership shall not withhold from such compensation or payments any amount(s) to cover Contractor's federal, state or other tax obligations. Contractor is not eligible for any social security, unemployment insurance or workers' compensation benefits from compensation or payments paid to Contractor under this Contract, except as a self-employed individual.

22. **Subcontracts and Assignment; Successors and Assigns**. Except as described and approved in Exhibits A and B, Contractor shall not enter into any subcontracts for any of the Work required by this Contract, or assign or transfer any of its interest in this Contract, without Estuary Partnership's prior written consent, which consent may be withheld in Estuary Partnership's sole discretion. In addition to any other provisions Estuary Partnership may require, Contractor shall include in any permitted subcontract under this Contract a requirement that the subcontractor be bound by the terms of this Contract as if the subcontractor were the Contractor. Estuary Partnership's consent to any subcontract shall not relieve Contractor of any of its duties or obligations under this Contract.

23. **No Third Party Beneficiaries**. Estuary Partnership and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this Contract gives, is intended to give, or shall be construed to give or provide any benefit or right, whether directly, indirectly or otherwise, to third persons unless such third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of this Contract.

24. **No Warranty by Estuary Partnership; Disclaimer.** Any information provided by Estuary Partnership is provided As-Is, Where-Is, without representation or warranty of any kind. WITHOUT LIMITATION, THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND THE IMPLIED WARRANTY OF MERCHANTABILITY ARE DISCLAIMED.

25. **Merger Clause; Waiver**. This Contract and attached exhibits constitute the entire agreement between the parties on the subject matter hereof. There are no understandings, agreements, or representations, oral or written, not specified herein regarding this Contract. No waiver, consent, modification or change of terms of this Contract shall bind either party unless in writing and signed by both parties. Such waiver, consent, modification or change, if made, shall be effective only in the specific instance and for the specific purpose given. The failure of Estuary Partnership to enforce any provision of this Contract shall not constitute a waiver by Estuary Partnership of that or any other provision.

26. **Notice**. Except as otherwise expressly provided in this Contract, any communications between the parties hereto or notices to be given hereunder shall be given in writing by personal delivery, e-mail, facsimile, or mailing the same, postage prepaid, to Contractor or Estuary Partnership at the address or number set forth on the signature page of this Contract, or to such other addresses or numbers as either party may hereafter indicate pursuant to this Section 24. Any communication or notice so addressed and mailed shall be deemed to be given five (5) days after mailing. Any communication or notice delivered by facsimile shall be deemed to be given when receipt of the transmission is generated by the transmitting machine. To be effective against Estuary Partnership, such facsimile transmission must be confirmed by telephone notice to Estuary Partnership's

Contract Administrator. Any communication or notice by personal delivery shall be deemed to be given when actually delivered.

27. **Severability**. The parties agree that if any term or provision of this Contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if this Contract did not contain the particular term or provision held to be invalid.

28. **Counterparts.** This Contract may be executed in several counterparts, all of which when taken together shall constitute one agreement binding on all parties, notwithstanding that all parties are not signatories to the same counterpart. Each copy of this Contract so executed shall constitute an original.

Certification: The individual signing on behalf of Contractor hereby certifies and swears under penalty of perjury: (a) the number shown at the top of this form is Contractor's correct taxpayer identification; (b) Contractor is not subject to backup withholding because (i) Contractor is exempt from backup withholding, (ii) Contractor has not been notified by the IRS that Contractor is subject to backup withholding as a result of a failure to report all interest or dividends, or (iii) the IRS has notified Contractor that Contractor is no longer subject to backup withholding; (c) Contractor is a U.S. person (including a U.S. resident alien); (d) Contractor is an independent contractor as defined in ORS 670.600; and (e) the above Contractor data is true and accurate.

CONTRACTOR	**ESTUARY PARTNERSHIP**
By: _____	By: _____
Title: _____	Title: Executive Director
Date: _____	Date: _____

Exhibit A
STATEMENT OF WORK, BUDGET NARRATIVE AND DELIVERABLES

CONTRACTOR: _____ **CONTRACT #**
PRINCIPAL PROJECT MANAGER: _____

Begin: On the date this Contract is fully executed and approved by all parties.

End: When Contractor's completed performance has been accepted by Estuary Partnership **or** on **xxxxx, 20xx**, whichever is sooner.

PROJECT TITLE: _____

PROJECT DESCRIPTION: _____

PROJECT TOTAL $_____

COST SHARE REQUIRED
[ ] Yes, please provide detail in Exhibit A: Task Description and Exhibit B: Budget Detail **[X]** None Required

Allowable Sources of Cost Share, if required above. Not required.
[ ] Federal **[ ]** Non-Federal

Source of Estuary Partnership Funds
[ ] Federal **[ ]** State**[ ]** Private **[ ]** Other
If federal funds are the source of Estuary Partnership funds or the source of required cost share, then procurement processes must meet Federal Contracting Rules, defined in Exhibit E.

OWNERSHIP OF WORK PRODUCT

The indicated provision applies to ownership of the work product resulting from this Contract:

☐ All of the Work product/deliverable of Contractor, its employees, agents and contractors that results from this Contract is the exclusive property of Estuary Partnership and Estuary Partnership is deemed the author and as such protected by the copyright law. As such, the Work in whole in or in part may not be reproduced without the expressed written consent of Estuary Partnership and must be cited using generally accepted citation standards. Contractor, its employees, agents and contractors, forever waive any and all rights relating to the Work, including without limitation, any and all rights arising under 17 USC §106A or any other rights of identification of authorship or rights of approval, restriction or limitation on use or subsequent modifications. The Contractor may upon written approval of Estuary Partnership use the scientific data, conclusions and recommendations of the Work product(s) pursuant to this Contract for noncommercial educational purposes, including publishing scientific papers. Estuary Partnership must receive recognition in writing as described in Section 7 above for such use or publication; written citation shall follow generally accepted citation standards.

☐ The work product/deliverable of Contractor, its employees, agents and contractors that results from this Contract is the result of shared funding and consequently Estuary Partnership and Contractor shall co-own the work product. Each party is considered a co-author and as such be protected by the copyright law. As such, the Work in whole in or in part may not be reproduced without using generally accepted citation standards.

☐ Ownership clause does not apply.

Note: See Section IX of the RFP for description of anticipated statement of work.

Exhibit B
BUDGET DETAIL

CONTRACTOR: _____ **CONTRACT # XX-2013**

PROJECT TITLE: _____

See budget template provided in RFP.

EXHIBIT C

Indemnity Agreement for Third Party Contractors

East Multnomah Soil and Water Conservation District
Partners in Conservation Program

This Indemnity Agreement ("Agreement") is entered into by and between East Multnomah Soil and Water Conservation District ("District") and _____ ("Contractor"), and shall be effective upon signing by both parties hereto.

WHEREAS, the Contractor has been retained by, or on behalf of, a Partner of the District pursuant to an underlying agreement ("Underlying Agreement") entered into between the District and the Partner to provide services relating to, or otherwise carry out, a project that is partially or completely funded by the East Multnomah Soil and Water Conservation District ("District"),

THEREFORE, for the mutual consideration contained herein, the District and the Contractor hereby agree as follows:

1. This Agreement shall apply to services performed by the Contractor pursuant to any Underlying Agreement for the purposes herein described, whether or not this Agreement is attached to, or expressly made a part of, such Underlying Agreement.

2. In carrying out its duties and obligations under the Underlying Agreement, the Contractor shall indemnify and hold harmless the District, its officers, directors, agents and employees, against any and all losses, claims, damages and expenses, including reasonable and necessary attorney's fees, to the extent any such losses, claims, damages and expenses are due to the acts or omissions of the Contractor, its officers, directors, agents and employees. The Contractor shall have no obligation to indemnify the District should any such losses, claims, damages and expenses result, in whole or in part, from acts, omissions, willful misconduct or gross negligence of the District, its affiliates, officers, directors, agents and employees.

DATED this _____ day of _____, 20___.

CONTRACTOR:

Signature: _____ Firm/DBA: _____

Name & Title: _____ CCB#: _____

Phone: _____

DISTRICT:

Signature: _____

Name & title: _____

Exhibit D
INSURANCE

During the term of this Contract, Contractor shall maintain at its own expense each insurance noted below marked with an "X":

1. ☒ **Required by Estuary Partnership of contractors with one or more workers, as defined by ORS 656.027**. **Workers' Compensation** insurance in compliance with ORS 656.017, which requires subject employers to provide Oregon workers' compensation coverage for all their subject workers. Estuary Partnership shall not assume workers' compensation coverage for contract employees, and CONTRACTOR AGREES TO INDEMNIFY AND DEFEND ESTUARY PARTNERSHIP FROM AND AGAINST CLAIMS, LOSSES, OR LIABILITY OF ANY GOVERNMENT ARISING FROM OR RELATED TO CONTRACTOR'S FAILURE TO PROVIDE SUCH INSURANCE COVERAGE.

2. ☒ **Required by Estuary Partnership** ☐ **Not required by Estuary Partnership.**
Professional Liability insurance with a combined single limit, or the equivalent, of not less than ☐ $200,000, ☐ $500,000, ☐ $1,000,000, or ☒ $2,000,000 each claim, incident or occurrence. This is to cover damages caused by error, omission or negligent acts related to the professional services to be provided under this Contract.

3. ☒ **Required by Estuary Partnership** ☐ **Not required by Estuary Partnership.**
General Liability insurance with a combined single limit, or the equivalent, of not less than ☐ $200,000, ☐ $500,000, ☐ $1,000,000, or ☒ $2,000,000 each occurrence for Bodily Injury and Property Damage. It shall include contractual liability coverage for the indemnity provided under this Contract. It shall provide that Estuary Partnership, OPRD, and ODFW officers and employees are Additional Insureds but only with respect to the Contractor's services to be provided under this Contract.

4. ☒ **Required by Estuary Partnership** ☐ **Not required by Estuary Partnership.**
Automobile Liability insurance with a combined single limit, or the equivalent, of not less than ☐ Oregon Financial Responsibility Law (ORS 806.060), ☐ $200,000, ☒ $500,000, or ☐ $1,000,000 each accident for Bodily Injury and Property Damage, including coverage for owned, hired or non-owned vehicles, as applicable.

5. ☐ **Government Agency – Self Insurance Permitted**

6. Notice of cancellation or change. There shall be no cancellation, material change, reduction of limits or intent not to renew the insurance coverage(s) without 30 days prior written notice from the Contractor or its insurer(s) to Estuary Partnership.

7. **Proof of Insurance.** As evidence of the insurance coverages required by this Contract, Contractor shall furnish acceptable insurance certificates to Estuary Partnership prior to commencing the work. The certificate shall specify all of the parties who are Additional Insureds, including, but not limited to, the Estuary Partnership, OPRD, and ODFW. The Contractor shall be financially responsible for all pertinent deductibles, self-insured retentions and/or self-insurance.

Exhibit E
COMPLIANCE WITH FEDERAL CONTRACTING RULES

Compliance with Federal Law and Contracting Rules.
Contracts whose funding is identified in Exhibit A of Contract as federal must comply with each provision below.

Payment. Estuary Partnership shall disburse funds in accordance with the terms and conditions of this Contract and the cost principles of OMB Circular A-122 (Non-Profit Organizations), as applicable.

Compliance with Laws. Contractor shall comply with all other local, state, and federal laws, rules, regulations, and guidelines to which it or this Contract may be subject (the "Laws"), including but not limited to the applicable provisions of 40 CFR Chapter 1, Subchapter B, applicable Office of Management and Budget ("OMB") circulars. The inclusion of any specific legal requirements under any of the Laws in these Terms & Conditions does not relieve the Contractor of any of its other obligations under any of the Laws. Contractor further agrees to keep current on any changes in any of the Laws.

Property. Contractor agrees to comply with all applicable provisions of OMB Circular A-110 relating to property, equipment, and supplies acquired with this Contract. Contractor is subject to all provisions of OMB Circular A-110 relating to intangible property rights, including but not limited to, the provision relating to the reservation by the EPA of a royalty-free, nonexclusive and irrevocable right to reproduce, publish, or otherwise use any copyrighted work produced by this Contract for federal purposes, and to authorize others to do so.

Procurement Responsibilities. Contractor agrees to comply with the procurement requirements mandated by the EPA in its Cooperative Agreement with Estuary Partnership, and the procurement procedures listed in OMB Circular A-110. Contractor shall ensure that the applicable contract provisions listed in Appendix A of OMB Circular A-110 are included in any contract awarded by Contractor.

Exhibit F
OPRD CONDITIONS OF WORK

1. The Contractor shall access project work areas using access routes specified in the design drawings. If the Contractor desires to access work areas using other access routes, the Contractor is solely responsible for coordination with OPRD, Estuary Partnership, and, if applicable, ODOT and UPRR to obtain permission. For these alternate routes, the Contractor would be responsible for meeting all site access conditions required by OPRD, UPRR, and/or ODOT each time the Contractor, subcontractors, or employees of either enter the site.

2. The Contractor shall notify Estuary Partnership and OPRD staff when Contractor, any subcontractors, or any employees of such shall be on the project site.

3. Contractor is advised that the site is located within a public recreation facility that will remain open to the public during the construction period. The Contractor shall coordinate with OPRD and Estuary Partnership staff to provide for public safety during construction and to maintain both pedestrian and vehicle access. The Contractor shall conduct job hazard assessment prior to project and ensure Contractor's work protects visitors, environment, and staff with use of appropriate signs/barricades. Contractor shall conduct tailgate or pre-shift safety meetings.

4. No pets are allowed on site during construction.

5. Construction operations shall be allowed 7 am to 7 pm or as approved by OPRD staff. Construction operations are prohibited during weekends and holidays.

6. The Contractor shall maintain areas free of waste materials, debris, and rubbish and maintain the site in a clean and orderly condition. The Contractor shall remove waste materials, debris, and rubbish from the site immediately upon such materials becoming unfit for use in the work. In the event this material is not removed, Estuary Partnership and OPRD staff reserve the right, but do not have the duty, to have the material removed and the expense shall be charged to the Contractor.

7. The Contractor shall provide toilet and wash-up facilities for the work force at the site. These shall comply with applicable laws, ordinances, and regulations pertaining to public health and sanitation.

8. The Contractor shall stage equipment and materials in designated areas only, and all refueling shall occur on paved surfaces and in the presence of appropriate spill containment equipment. The Contractor may stage LWD along the two streams; however, the Contractor shall not stage LWD in piles or log decks but rather as individual logs. The Contractor shall be responsible for protecting logs from firewood cutting.

9. No fires will be allowed on site.

10. Smoking by employees of Contractor or subcontractor is strictly prohibited on all OPRD properties.

11. Contractor shall maintain supply of fire suppressing equipment (shovels, burlap bags, etc.) on site at all times.

12. Within areas specified for ground disturbance, there are no known locations of historic or prehistoric sites, buildings, objects, and properties related to American history, architecture, archaeology and culture. However, OPRD and the Estuary Partnership may modify the Contract or temporarily stop work to protect any areas, objects of antiquity, artifacts, or similar objects discovered during the project that are

or may be protected by cultural and historic resource regulations regardless of when the area, object or artifact is discovered or identified. Discovery of such areas or objects by either party shall be immediately reported to the other party. An OPRD archaeologist will be on-site during construction.

13. All equipment to be brought onsite that will be operating beyond existing roads shall be cleaned prior to arrival to prevent noxious and non-native seed contamination of the site. Mud, dirt, seeds, plant parts, and other debris shall be removed from equipment before moving it into the project area. This requirement also applies to service trucks, water trucks, pickup trucks, cars and other passenger vehicles used in the daily transport of personnel if they will travel off the existing road surface. Contractor shall certify in writing that all off-road vehicles and equipment are free of noxious weeds prior to the start of operations. Contractor shall employ whatever cleaning methods are necessary to ensure that equipment and vehicles are free of noxious weeds. Disassembly of equipment components or specialized inspection tools is not required. Visual inspections will be conducted without warning during operations.

14. Workers shall inspect, remove, and properly dispose of mud, weed seed and plant parts found on their clothing, shoes, tools and small equipment on a daily basis prior to entering the site and beginning operations.

15. All sand, gravel, soil, boulders, borrow and fill material shall be inspected, treated if necessary, and ensured that it is weed free before use. When certified sources are reasonably available, sand, gravel, borrow and fill materials shall be certified weed free.

16. Stockpiled, un-infested sand, gravel, soil, boulders, borrow and fill material shall be maintained in a weed-free condition until used for the project.

17. Only certified weed-free straw, erosion control mats, plant materials (including seed mixes) or other weed-free mulch, plant materials, and erosion control materials shall be used during re-vegetation, construction, and erosion control.

18. Soil disturbance shall be minimized to the extent practical, consistent with project objectives.

19. Only native plant materials shall be used for seeding and tree and shrub planting.

20. Seeding and mulching of disturbed areas shall occur immediately after construction is completed.

21. OPRD will provide the Contractor with parking passes. The Contractor shall ensure these passes are displayed in each vehicle parked on OPRD property.

Attachment 5 – Materials Supplied by OPRD

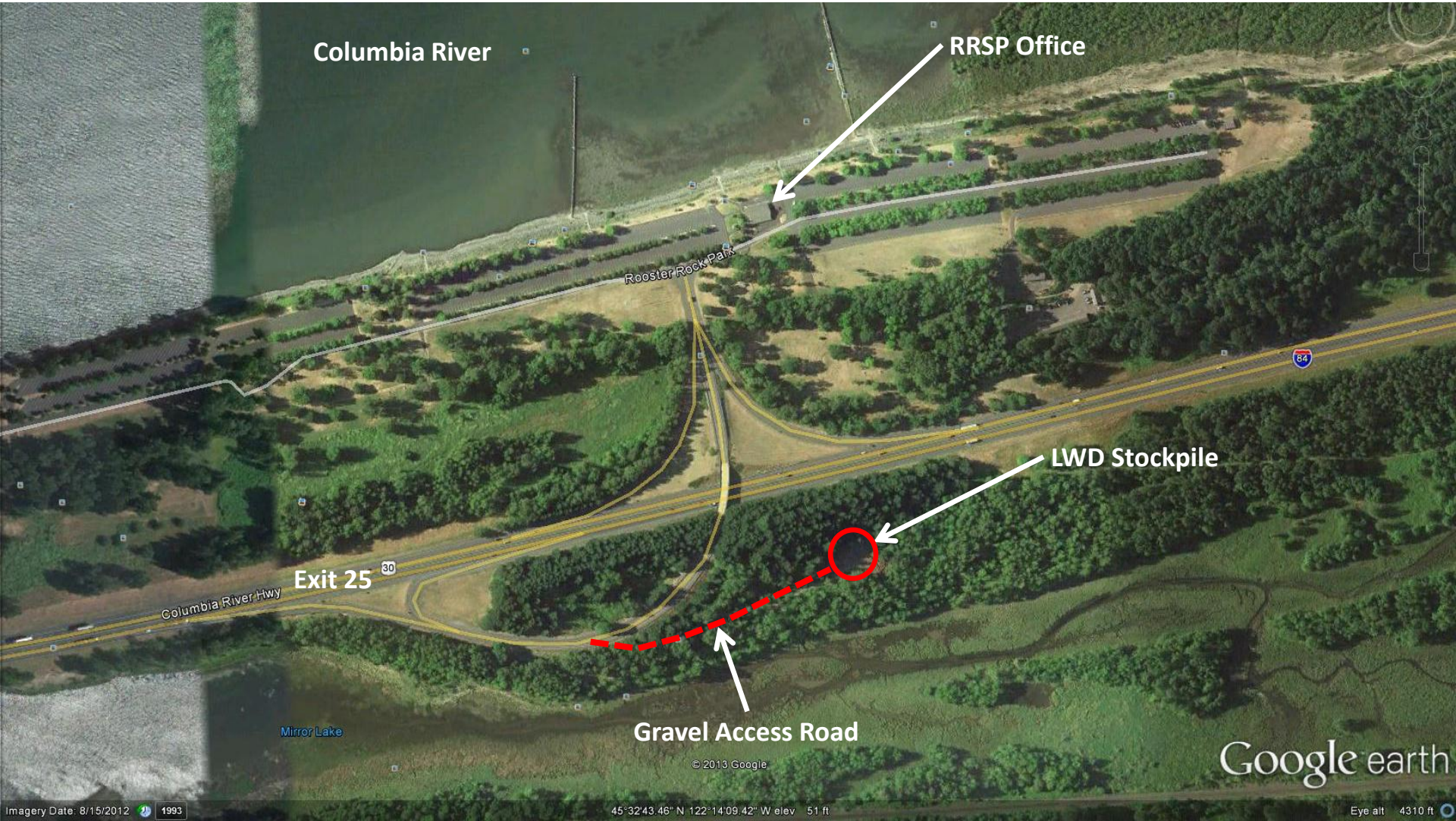
Multnomah and Wahkeena Creek Restoration Project – Phase I

Attachment 5:

The following materials will be furnished by OPRD for the use and installation by the Contractor on the project:

- 20 logs with rootwads; and,
- 60 logs without rootwads.

These logs and logs with rootwads are located on Rooster Rock State Park (RRSP) property, approximately 5 miles west of the project site. The contractor shall transport all logs provided by OPRD to the project site for eventual placement in Wahkeena and Multnomah Creeks.



Attachment 5 (continued): large woody debris available for project

Attachment 6 – Map of Known Subsurface Infrastructure
Multnomah and Wahkeena Creek Restoration Project – Phase I

There is another line that goes to Wahkeena?

Water line from pump House

Waterline to Drain

Irrigation Pipe

BENSON STATE PARK UTILITIES MAP

LEGEND

POTABLE WATER	W
IRRIGATION	
ELECTRIC LINES	
TELEPHONE LINES	
SEWER	+ + + + + + +
PUMP	
GATE VALVE	
STANDPIPE	
DRAIN	
QUICK COUPLER VALVE	
DISTRIBUTION BOX	

SCALE 1" - 100' FEB. 1976

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