Farming in the Floodplain Project: Phase 2

Research Plan

Prepared by ESA

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This document details the research plan for technical work to be conducted by Environmental Science Associates (ESA) for Phase 2 of the Farming in the Floodplain Project (FFP). ESA is a consultant to PCC Farmland Trust. Phase 2 will be conducted from August 2016 through June 2017. Since February 2016, ESA has been under contract with PCC Farmland Trust to conduct technical work under the first phase of the FFP. Phase 1 tasks included facilitating a Technical Advisory Group, coordinating with landowner engagement, writing an Existing Conditions Report, and developing recommendations for future technical work. The Phase 2 tasks described below are based on the findings of Phase 1 work and have been discussed with PCC Farmland Trust, the Technical Advisory Group, Pierce County Surface Water Management, Drainage District 10, and individual farmers in the Clear Creek area.

Task 1 – Technical Advisory Group

ESA will continue to lead the Technical Advisory Group (TAG) alongside PCC Farmland Trust. ESA staff will facilitate the TAG meetings. Two to three ESA staff members will attend each TAG workshop to participate in discussions. ESA staff will develop meeting agendas, provide meeting materials, and coordinate with PCC Farmland Trust to plan the content of the meetings. Meeting reports will be prepared by PCC Farmland Trust staff. One TAG meeting, tentatively scheduled for November, will involve a presentation on sediment by USGS staff (see Task 5). Three TAG meetings are planned for Phase 2 work.

Deliverables:

- Meeting agendas

Task 2 – Drainage System Inventory

ESA staff will develop an inventory of the agricultural drainage system in the Clear Creek area. ESA staff will conduct field work to collect information on the location, size, and condition of drainage ditches, structures, and culverts. This information will be documented in data tables. ESA will not formally survey the drainage ditches, but will collect GPS data to identify where field observations and measurements were taken. Field work will focus on drainage ditches and structures owned by Drainage District 10 and other major private ditches (such as Nancy's Ditch and South Ditch). As time allows, ESA staff will also inventory other key private ditches and roadside ditches owned and operated by Pierce County Roads. ESA will spend up to 20 hours researching ownership and maintenance responsibilities for identified drainage features. However, it may not be possible to establish ownership and maintenance responsibilities for some drainage features in the area. ESA will develop a detailed map of

the existing drainage system based on GPS field measurements, data gathered in the field, and interpretation of aerial photography. ESA will identify areas of the drainage system that require maintenance and recommend steps to address those areas. ESA will submit a memorandum in fall 2016 with preliminary data tables from the inventory field work to assist Drainage District 10 and area farmers and residents in planning maintenance activities. ESA staff will visit the Clear Creek area in the winter or spring to observe drainage conditions when water levels are higher. ESA will prepare a Drainage Inventory Memorandum, including data tables from the inventory, the detailed map of the existing drainage system, observations from the winter/spring field visit, results of ownership and maintenance responsibility research, and recommended steps to address maintenance issues. ESA will submit a draft memorandum to PCC Farmland Trust for their review and for review by other project stakeholders (including Drainage District 10). Based on comments received, ESA staff will revise and submit a final memorandum.

ESA and PCC Farmland Trust are not regulatory entities and will not be collecting information relating to regulatory compliance. ESA will only share information directly with PCC Farmland Trust. PCC Farmland Trust will ensure landowner confidentiality. Information will only be shared on the location, size, and condition of drainage features. Landowners who would like to discuss confidentiality are encouraged to contact Jordan Jobe at PCC Farmland Trust.

The purpose of the drainage system inventory is to provide an improved map and qualitative information on the agricultural drainage system that can be used in the future to inform the planning and design of projects such as the proposed Clear Creek Floodplain Reconnection Project, projects undertaken by Drainage District 10 or individual landowners, and other multiple-benefit projects in the area to ensure they improve agricultural drainage. The drainage system inventory is for planning purposes only; it will not be detailed enough to develop permit applications or design plans.

Deliverables:

- Preliminary findings memorandum
- Draft Drainage Inventory Memorandum
- Final Drainage Inventory Memorandum
- Detailed map of the existing drainage system

Task 3 – Tide Gate Assessment

Under this task, ESA will evaluate how the tide gates at the mouth of Clear Creek currently work, and review accounts of how they have worked in the past. ESA will coordinate with Drainage District 10, the Port of Tacoma, and Pierce County to identify sources of information on the tide gates. ESA staff will use existing information on river and creek levels to develop a simple Microsoft Excel model of tide gate operations. ESA will use the tide gate operations model to evaluate the feasibility and effectiveness of potential actions such as installation of new tide gates, structural modification of the existing tide gates, or modified operations of the existing tide gates. ESA will submit a draft Tide Gate Assessment Memorandum to PCC Farmland Trust for their review and for review by other project stakeholders. Based on comments received, ESA staff will revise and submit a final memorandum.

Deliverables:

- Draft Tide Gate Assessment Memorandum
- Final Tide Gate Assessment Memorandum

Task 4 – Flood Risk Research

The Existing Conditions Report developed in Phase 1 found that flood risk in the Clear Creek area is complex and is not well understood by all residents or stakeholders in the area. Under this task, ESA staff will conduct additional research and coordinate with Pierce County Surface Water Management and the U.S. Army Corps of Engineers to revise and update the information on flood risk described in the Phase 1 Existing Conditions Report in order to better inform farmers and residents in the Clear Creek area. ESA staff will meet with Pierce County Surface Water Management staff in person to discuss flood risk, ask questions, and identify additional information sources. ESA staff will contact the U.S. Army Corps of Engineers to discuss the vulnerability of River Road Levee to overtopping and breaching. However, it may not be possible to obtain additional information from the Corps. ESA will develop a Flood Risk Memorandum which will provide additional qualitative information on flood risk within the Clear Creek area. The Memorandum will address and clarify flood risk to residents and farms from:

- Puyallup River flooding,
- the vulnerability of River Road Levee,
- Clear Creek and its tributaries,
- channel aggradation, and
- climate change.

ESA staff will deliver a draft Flood Risk Memorandum for review by PCC Farmland Trust and other project stakeholders. Based on comments from PCC Farmland Trust and other stakeholders, ESA staff will revise and submit a final Flood Risk Memorandum.

Deliverables:

- Draft Flood Risk Memorandum
- Final Flood Risk Memorandum

Task 5 – Document Sediment Discussion at TAG Meeting

As described in Task 1, ESA will facilitate a Technical Advisory Group meeting with a USGS presentation on sediment in the Puyallup Watershed and Clear Creek area in fall 2016. Other experts on sediment, such as Pierce County Surface Water Management staff, may also present at the TAG meeting. ESA will summarize the sediment information provided by USGS staff in a memorandum. The memorandum will also reflect the information presented and discussed at the TAG meeting. The purpose of the memorandum will be to document the information about sediment provided for and discussed at the TAG meeting. ESA will not conduct additional research or analysis on sediment.

Deliverables:

- Sediment Memorandum

Task 6 – Evaluation of Upstream Development

Throughout the first phase of the FFP, residents of the Clear Creek area asked how development in upstream areas of the Clear Creek Basin has affected flooding, drainage, and sediment conditions in the Clear Creek area. Under this task, ESA will evaluate impacts from upstream development on the amount of runoff delivered to the Clear Creek area in order to increase understanding of the effects of upstream development. We will conduct a GIS exercise using historic and recent aerial imagery and available land cover data to estimate the change in impervious surface within the Clear Creek Basin over time. No modeling of stormwater runoff will be conducted. If information on the existing stormwater storage and treatment infrastructure in the Clear Creek Basin is available, we will incorporate that information into the mapping. ESA will prepare an Upstream Development Memorandum describing changes in impervious surface in upstream areas of the Clear Creek Basin. The memorandum will include a brief description of stormwater regulations in the area during different periods of development. The memorandum will also include a description of regulations relating to stormwater retrofits in the area. Depending on the problems identified in the evaluation, ESA will recommend actions that could be undertaken by Pierce County, Drainage District 10, or other stakeholders to address identified problems. ESA will submit a draft Upstream Development Memorandum to PCC Farmland Trust for their review and input from other project stakeholders. Based on comments received, ESA staff will revise and submit a final report.

Deliverables:

- Draft Upstream Development Memorandum
- Final Upstream Development Memorandum

Task 7 – Farmland Impacts Evaluation

ESA will describe the anticipated impacts of SWM's proposed Clear Creek Floodplain Reconnection Project on farms and farmland in the Clear Creek area. ESA will primarily consider qualitative factors and focus on changes to flood risk, groundwater, drainage, sediment, and water quality as they relate to farmland and agricultural viability. One potential component of the Clear Creek Floodplain Reconnection Project would be the inclusion of farmland on the wet side of the levee. The evaluation will include impacts to both the potential farmland on the wet side of the ring levee as well as impacts to existing farmland on the dry side of the ring levee. The evaluation will consider up to three conceptual levee alignments developed by SWM. ESA will submit a draft Farmland Impacts Evaluation Memorandum to PCC Farmland Trust for their review and for review by other project stakeholders. Based on comments received, ESA staff will revise and submit a final memorandum.

Deliverables:

- Draft Farmland Impacts Evaluation Memorandum

- Final Farmland Impacts Evaluation Memorandum

Task 8 – Findings and Recommendations Report

Under this task, ESA will develop a Findings and Recommendations Report incorporating conclusions, recommendations, and next steps identified through Tasks 2 through 7. The report will also tie the conclusions of Tasks 2 through 7 to agricultural viability in the Clear Creek area. The final deliverables associated with Tasks 2 through 7 will be appended to the Findings and Recommendations report, which will serve as the grant deliverable for the Farming in the Floodplain Project. ESA will submit a draft Findings and Recommendations Report to PCC Farmland Trust for their review and for review by other project stakeholders. Based on comments received, ESA staff will revise and submit a final report.

Deliverables:

- Draft Findings and Recommendations Report
- Final Findings and Recommendations Report

Task 9 – Coordination with Landowner Engagement

PCC Farmland Trust will continue to lead a landowner engagement process as part of the FFP in Phase 2. ESA will coordinate with and support up to two workshops or meetings with local landowners and farmers. The workshops will be led by PCC Farmland Trust and ESA will present materials and participate in discussions as requested. The landowner engagement effort will also include ESA staff participation in site visits to the Clear Creek area, which will be organized by PCC Farmland Trust.