

**Sustainable Water
Scope of Work
Wastewater Reuse Feasibility Study
July 2017**

Purpose

This Scope of Work is designed to evaluate the potential for year-round wastewater reuse for a hydroponic system for the City of John Day, Oregon. The scope is generally designed to meet the following objectives:

- Develop a conceptual year-round wastewater reuse strategy using hydroponics to grow crops for human consumption.
- Work with Anderson Perry & Associates, Inc. (AP), who will be updating the City's Wastewater Facilities Plan (WWFP) to include hydroponics as a reuse option. AP will be developing treatment options for producing a Class A effluent to meet U.S. Environmental Protection Agency and Oregon Department of Environmental Quality standards for growing crops for human consumption. Sustainable Water (SW) will prepare the hydroponics reuse system conceptual design, planning level construction cost estimates, and operation and maintenance cost estimate including estimated annual revenue from crop sales.

Scope of Work

The following Scope of Work is divided into four general categories.

2.1 Literature Review and Prerequisite Work

- Review 2010 Wastewater Facilities Plan.
- Review flow summary developed by AP for the 2017 WWFP Update.
- Collaborate with AP on WWFP Update.

2.2 Conceptual Design Development

- Determine types, quantities, and monthly demand profiles of reclaimed water for year-round hydroponic use for different crop types. Quantities will be based on available land identified in the City of John Day Innovation Gateway Area for greenhouse development.
- Assess baseline potable or alternative "clean" water quality characteristics to inform basis of design for reclaim / reuse system.
- Prepare-Assess water quality use requirements for different crop types, proposed for irrigation by reclaimed water.
- Assess long-term wastewater reuse demands and water quality considerations based on community planning documents (which may include non-agricultural uses for reclaimed water)
- Review regulatory requirements summarized by AP for Class A reuse, Class B reuse, and surface water discharge.
- Prepare a conceptual design for hydroponic treatment to produce a Class A effluent for consideration as a treatment option for inclusion in the WWFP Update prepared by AP. Prepare preliminary costs for this option to include capital costs and operation and maintenance costs.

2.3 Conceptual Reuse Facility Design

- Review state and local regulations pertaining to siting hydroponics greenhouses.
- Facilitate a preliminary siting and conceptual design meeting with applicable stakeholders.
- Develop a conceptual basis of design for a hydroponic reuse system.
 - Hydraulic Capacity
 - Influent and Effluent Water Quality and Effluent Quantity
- Develop conceptual reuse scenarios with seasonal operation plans and water balance.
- Prepare “planning-level” PF&ID, reactor volumes and footprint, and water storage sizing requirements for system budgetary purposes
- Develop a concept level site plan showing facility layout. Work with AP to develop an overall site plan for treatment and reuse facilities.

2.4 Life Cycle Economic Analysis

- Develop a concept level capital cost project budget for the hydroponic reuse facilities.
- Develop a concept level operation and maintenance budget.
- Develop a concept level income analysis for the crop types evaluated for hydroponic reuse.
- Perform a preliminary life cycle economic analysis showing costs versus income with anticipated payback timelines.