Oregon Water Resources Department
Water Conservation, Reuse, and Storage
Feasibility Study Grant Application

I. Study Information

Study Name: City of John Day, Oregon - Feasibility Study for Wastewater Reuse

Type of Feasibility Study: ☐ Water Conservation ☒ Reuse

☐ Storage (Above-Ground) ☐ Storage (Below-Ground)

☐ Storage (Other)

Requested Grant Amount: $50,000

Total Cost of Feasibility Study: $110,000

Note: Request(s) may not exceed $500,000 per project; grant funding requests must demonstrate a match of at least 50% of the total project cost. This may include in-kind and cash match. Please refer to the Feasibility Study Grant Application Guidance for an explanation of these requirements.

II. Applicant Information

Applicant Name: City of John Day	**Co-Applicant Name:**
Address: 450 East Main Street	Address:
John Day, Oregon 97845	
Phone: 541-575-0028	Phone:
Fax: 541-575-3668	Fax:
Email: greenn@grantcounty-or.gov	Email:

Principal Contact: Nicholas Green, City Manager
Address: 450 East Main Street
John Day, Oregon 97845
Phone: 541-575-0028
Fax: 541-575-3668
Email: greenn@grantcounty-or.gov

Certification:

I certify that this application is a true and accurate representation of the proposed work for a project feasibility study and that I am authorized to sign as the Applicant or Co-Applicant. By the following signature, the Applicant certifies that they are aware of the requirements of an Oregon Water Resources Department grant, have read and agree to all conditions within the sample grant agreement and are prepared to conduct the feasibility study if awarded.

Signature of Applicant/Authorized Person: _____ Date: October 14, 2016

Print Name: Nicholas Green Title: City Manager

III. Feasibility Study Summary

1. Please provide a brief, 4-5 sentence summary of the feasibility study. This summary should include a brief description of the goal of the water conservation, reuse, or storage project being studied and the purpose of the study. Please refer to the Feasibility Study Grant Application Instructions for additional information on what to include in your study summary.

   The City of John Day, Oregon, operates a wastewater treatment facility that has treated wastewater available for beneficial reuse. The feasibility study will evaluate two options for reuse: 1) a commercial-scale water reclamation and reuse system to use treated wastewater to produce hydroponic horticulture, and 2) an irrigation system to reuse treated wastewater to irrigate land and produce economically viable pastureland. A feasibility study is needed to evaluate these options and recommend a preferred option and funding path to lead to the beneficial reuse of wastewater for the City of John Day.

IV. Study Location

Instructions: Please answer the following questions about the location of the feasibility study and project being evaluated.

2. Please provide the following information about the study and project location.

   a. Latitude/Longitude: 44°25'22.29'' N/ -118°57'31.41'' W

   b. County: Grant

   c. Watershed: Laycock Creek - John Day River HUC 1707020109

   d. Water rights (list permit/certificate/transfer/lease, as applicable): N/A

3. Please attach a site plan map showing the following:

   a. Feasibility study area boundaries
   b. Project area (if implemented)
   c. True north arrow
   d. Map title and legend
   e. Latitude and longitude
   f. Property boundaries
   g. Surface water bodies
   h. Sampling locations (if proposed)

4. List who owns the lands on which the study would occur and would be impacted by implementation of the project in the table below. Provide evidence that you have authorized access to the lands on which the study would occur.

Tax Lot ID	Landowner Name	Feasibility Study	Project Implementation
Map 13S31E22D (Tax Lot 300)	DR Johnson	☒	☐
Map 13S31E (Tax Lot 200)	David Holmstrom	☒	☐

The City is confident that access to these sites can be obtained. Discussions with landowners are ongoing and will continue as part of the feasibility study; see Task 3 for details.

V. Feasibility Study Specifics

Instructions: Please answer all questions in this section. As applications are expected to result in additional pages to complete this section, you may attach your responses on a separate document as long as you indicate the question numbers in your response.

A. Study Description, Needs, and Goals

5. Describe the feasibility study goal.

   The goal of the feasibility study is to assess the viability of reclaimed water reuse by analyzing the costs and benefits of two alternative wastewater reuse options in a step by step process.

   The City of John Day operates a wastewater treatment facility that was constructed in 1949, with additions in 1970 and 1978. Wastewater is treated, then secondary effluent flows by gravity to four percolation ponds for disposal. The ponds are located on the north side of the John Day River, with approximately 80 feet of separation. The Oregon Department of Environmental Quality (DEQ) intended to issue the City a new Water Pollution Control Facilities Permit for a 10-year period; however, the DEQ did not issue the permit due to concerns over regulations that treat indirect and direct discharge to the river similarly and also require a National Pollution Discharge Elimination System Permit.

   This uncertainty regarding future compliance is an issue the City wishes to proactively address by updating its wastewater system. Through completing this feasibility study, the City will evaluate two options for reuse: 1) a commercial-scale water reclamation and reuse system to use treated wastewater to produce hydroponic horticulture, and 2) an irrigation system to reuse treated wastewater to irrigate land and produce economically viable pastureland. Both options would reuse the City's wastewater and possibly eliminate the need to indirectly discharge wastewater near the John Day River. It is also essential to protect the John Day River and its ecologically significant anadromous salmonid population. The City of John Day has put significant initial consideration into these options; see the attached memos dated August 23, 2016 (referencing Option 1) and January 26, 2015 (referencing Option 2).

   The location of the project area is shown on Figure 1, Location and Vicinity Maps, the conceptual hydroponic reuse option is shown on Figure 2, Hydroponic Reuse Option, and the conceptual irrigation option is shown on Figure 3, Wastewater Irrigation Option.

   This feasibility study is a critical step in identifying the best option for wastewater reuse. After this feasibility study is complete, the City's Wastewater Facilities Plan will be updated and design will commence immediately, if funding allows.

6. Describe how the proposed study would achieve the goal.

   The feasibility study will achieve the goal of assessing the viability of and comparing the two wastewater reuse options in a step by step process. First, the proposed study will provide a framework to conduct a literature review to determine the state of available technology to frame the initial questions for discussion. These driving questions regarding scale, location, funding, treatment options, and other critical issues will be discussed during a kickoff meeting, site visit, and other elements of preliminary outreach. The City of John Day has built a competitive team of industry experts, led by Anderson Perry & Associates, Inc., and Sustainable Water, who will work together to evaluate this complex project (referencing Attachment 3). Next, permitting specialists will conduct an initial regulatory review to determine the cost, time frame, and feasibility of permitting each option. Permitting specialists and the City of John Day will meet with relevant agencies to get initial feedback on potential benefits and concerns related to each option. Using information from the literature review, preliminary outreach, and initial regulatory review, the next step in the feasibility study will be to develop feasibility analysis criteria for each option. The criteria will include issues such as design parameters, construction costs, operational logistics, maintenance needs, financing strategies, and regulatory issues. A conceptual design for each option will then be developed and weighed against these feasibility analysis criteria. The outcome of the feasibility study will be a determination of the most viable option for wastewater reuse using data-driven decision making.

7. Describe the identified water need (local, regional, or statewide). Please provide data or a narrative substantiating the need.

   The City of John Day is located in the John Day Basin, which has a semi-arid climate and an average precipitation of approximately 13 inches, with the majority falling during the winter months. The community's economic base is agricultural, primarily ranching and forestry. The lack of precipitation, combined with high evapotranspiration and large withdrawals of water from both ground and surface water sources for irrigation of agricultural crops, creates a large water supply need. Currently, the City is indirectly discharging treated wastewater adjacent to the John Day River, a documented area of importance for Endangered Species Act-listed species. The City's wastewater treatment facility may be unable to meet future permit requirements for biochemical oxygen demand, total suspended solids, and chlorine residuals. Therefore, water that is allowed to percolate adjacent to the John Day River has the potential at times to degrade the water quality of the river. The City needs an alternative to discharging treated wastewater adjacent to the John Day River.

   The feasibility study will meet this identified water need through investigating ways to reuse the City's treated wastewater that is protective of the John Day River Basin and developing a wastewater reuse system that contributes positively to the City's economy.

8. Please provide evidence that water is available to meet the above described need. Evidence can include regulatory and physical information regarding water availability.

   Analysis of the City's Discharge Monitoring Reports determined that the average annual flow of wastewater is approximately 0.240 million gallons per day. This equates to 87.6 million gallons of wastewater in an average year that could be reused for either land irrigation or commercial hydroponics.

The proposed project could supply 100 percent of the irrigation needs for 120 acres of cropland for a year. It could also supply 100 percent of the water demand for hydroponic crops. This project is anticipated to meet 100 percent of the water disposal and storage needs, but the feasibility study is necessary to determine which reuse option is the most viable.

9. Describe the level of community support and commitment associated with the feasibility study. This may include any collaborative water planning efforts undertaken to identify the project or study.

   The City of John Day has assessed community support for the study through public meetings, newspaper and radio messages, and a motion of the City Council (letter of support attached). In addition, the two Grant County commissioners and the County Judge signed a letter of support. The significant support of elected officials representing the City and the County shows significant community support for this application because these officials are elected by the community and serve as representatives for their constituents. The city manager of John Day stated that members of the community have also expressed broad support for the project to him and also presented questions that may be further assessed in the preliminary outreach portion of the feasibility study (see Step 3).

   Overall, the residents of the City of John Day recognize the importance of a functional wastewater treatment facility that can provide a long-term solution to wastewater disposal needs while simultaneously capturing economic benefits for the community.

10. Describe how potential implementation of the project would benefit and/or impact the community.

    Implementation of either option would achieve protection of anadromous salmonid populations in the John Day River Basin through eliminating indirect discharge of treated wastewater adjacent to the river. In addition, implementation would benefit the community socially and economically in different ways depending on which option is selected.

    1) The commercial-scale water reclamation and reuse system has the potential to create economic value by scaling the greenhouses used for effluent treatment to grow cash crops for manufacturing and export. A new facility that takes advantage of economies of scale and forward-looking design innovations has the potential to create new jobs and an entirely new industry in John Day, while simultaneously bolstering existing industries, protecting the aquatic species of the John Day River from indirect discharge, and improving the land use of available industrial lands adjacent to the current treatment facility (see Figure 2). This would create multi-dimensional economic benefits and would help to address the high rate of unemployment in the County (Grant County currently has the highest unemployment rate in the state at 8.0 percent). The City could also be eligible for multiple low interest loans and grants related to Rural Business Services, including Rural Business Enterprise Grants, Rural Business Opportunity Grants, Rural Economic Development Loans, and Rural Economic Development Grants. Additionally, as cash crops are harvested and sold as exports, the revenue generated from those crops can be used to further offset the operations and maintenance costs of the facility, as a revenue source for future capital improvements, or to reduce the annual sewer rates charged to residents. Similar facilities have been used in conjunction with

universities to spur research and development into new agricultural uses and with industries to produce value-added cash crops and raw materials for manufactured goods. As Grant County does not currently have any higher education institutions, this option creates the opportunity for John Day to form public-private partnerships with state universities and industry partners that currently do not exist, with the potential to create net new job growth within the County. As this will likely be the most significant investment made in the County for the foreseeable future, this feasibility study will enable John Day to identify the option that will maximize job growth, educational benefits, and overall economic value within the financial constraints of the region.

2) The land application/irrigation system treatment and disposal option would contribute to economic growth by enhancing pasture land available for cattle grazing or creating new cash crop uses for the land (see Figure 3). This alternative would also benefit the City by providing a long-term solution to dispose of wastewater that can be simpler to operate than the current system and require fewer certifications for operators. This option may require significant upfront work with land purchases, lease agreements, and easements. A secure wastewater disposal system is beneficial to community stability and sustainable growth.

Both options could potentially equate to 87.6 million gallons of wastewater in an average year that could be reused for either land irrigation or commercial hydroponics. This would reduce the need to withdraw groundwater or surface water from the John Day River. Additionally, if this project is implemented, there is the potential for the improvement of water quality in the John Day River Basin because the City would no longer be indirectly discharging treated wastewater adjacent to the river.

11. Provide a list of letters of support (name and/or affiliation of sender is sufficient). Attach copies of the letters to your application.

    The following letters of support are included as attachments to this application:

    - City of John Day City Council
    - County Court of Grant County
    - Sustainable Water
    - Trout Unlimited

B. Study Key Tasks

12. Identify key tasks necessary to conduct the feasibility study using the following format and including as many key tasks as necessary to complete the feasibility study. In the event that your study receives grant funding, the key tasks identified will be incorporated into your grant agreement as the "Statement of Work." Please note: Project management is commonly a function within a specified key task and not a separate key task itself.

    Task number. Key Task Title
    - Task schedule: The approximate dates during which the key task will be completed.
    - Description of key task activities: Include specific details of the task such as task purpose, planned approach, appropriate technical information, proposed methods and rationale for the proposed approach.

- Qualified personnel that will complete task: Include a description of the professional experience, professional qualifications and licensure of personnel necessary to conduct the task.

The Feasibility Study will consist of seven key tasks, each of which will have subtasks that will be performed by various team members. Table 1 provides a detailed breakdown of these tasks by task number, title, schedule, activity and key personnel.

Task 1. Contract for Engineering/Consulting Services. This task will be performed by the City of John Day and consists of preparatory work related to grant administration and project management. The City will bear full responsibility for organizing and signing letters of agreement, memoranda of understanding, and contracting for professional services under the John Day Public Contracting Code. The deliverable will be a signed contract and definitive agreements governing all stakeholders throughout the feasibility study.

Task 2. Literature Review. This task will be performed by the full team including proposed academic partners. It consists of research into various reuse options to determine which studies have been performed to date and any existing cost-benefit analysis that has been performed on the options under consideration. This task will also provide an opportunity for all stakeholders to review the data and analysis already performed by John Day related to the existing treatment plant, collection system, and water systems. The anticipated task deliverables will include a sensitivity analysis, market analysis, and preliminary cost-benefit analysis.

Task 3. Preliminary Outreach. This task includes the team kickoff meeting in John Day, initial site visits to the proposed locations for the reuse options, and stakeholder engagement activities to determine the level of involvement and communication necessary for each stakeholder, including academic institutions, industry partners, government/regulatory agencies, and community residents. The anticipated task deliverables will be stakeholder identification, stakeholder analysis, and a strategic communications plan that will be used by John Day to coordinate and communicate about the remaining tasks.

Task 4. Regulatory Review. This task will be a comprehensive analysis of the current and future regulatory environment, looking specifically at permitting requirements, environmental impacts, and Oregon statutes. The review will be performed by permitting specialists within Anderson Perry with extensive experience in state and federal law, with advice from Trout Unlimited on environmental habitat requirements and opportunities. The City and its academic partners will take the lead in evaluating state and federal policies related to enterprise funds and municipal corporations, and identifying potential tax incentives, business incentives, and other options to encourage industry participation.

Task 5. Feasibility Analysis Criteria. This task will establish the criteria for evaluating the reuse options in order to make a final determination on which option will provide the highest benefit. The full team will evaluate and create relevant criteria related to four functional areas: (1) Regulatory/Policy, (2) Facility Design, (3) Building and Construction, and (4) Operations and Maintenance. The deliverable from this task will be a rubric with both quantitative and qualitative criteria that will be applied to Task 6 to help guide and evaluate the conceptual design options.

Task 6. Conceptual Design Development and Finance. This task will evaluate preliminary siting options, facility/system design approaches, and process-related activities for both reuse options. It will assess both the hydroponics and irrigation reuse options in several dimensions, including various water reuse scenarios, engineering and construction standards, concept-level process flow and instrumentation requirements, and conceptual site plans and facility design options. The task will also include a life cycle economic assessment so the total life cycle costs and benefits may be considered for both options. The final deliverables from this task will be a Process Flow, Instrumentation & Diagrams (PFI&D) report, Conceptual Site Plan and Facility Design including 3D drawings for a conceptual hydroponics facility, Hydraulic Capacity Analysis, Influent and Effluent Water Quality Analysis, and Life Cycle Economic Savings Analysis.

Task 7. Final Report. This task will be performed by the full team and will include the Final Feasibility Study, Selected Option, and Study Close-out subtasks. The report will provide the analytical foundation for the City of John Day to make a determination about which reuse option will provide the greatest benefit. The report will be provided to each stakeholder and will become the basis for future financing and development decisions during follow-on implementation.

Table 1.Task Breakdown by Task Number, Title, Schedule, Activity, and Key Personnel

Task	Task Title (Schedule)	Activities	Key Personnel
1.0	**Contract for Engineering/ Consulting Services** (Upon award, estimated to be July 2017)	Signing relevant contracts and memoranda of understanding with a qualified professional engineering firm, water reuse consulting firms, non-profit organizations, and universities	City of John Day
2.0	**Literature Review** (Aug - Nov 2017)	Research into each reuse option to determine studies and evaluations completed to date that could provide guidance for this feasibility study	Full Team
2.1	Cash Crop Research	Research into crops that have been successfully grown with reused wastewater, greenhouse technology, common pitfalls for vertical farming	John Day/ Academic Partners
2.1.1	*Sensitivity Analysis*	Document seasonal variations in crop prices and impact on profit margins	
2.1.2	*Market Analysis*	Evaluate market dynamics; potential export markets for international, domestic, and local use; high growth markets to target; industry competitors and partners, etc.	
2.1.3	*Cost-Benefit Analysis*	Breakdown of energy costs, labor costs, distribution costs, farming input costs, and corporate overhead costs including capital costs; comparison of costs to social benefits of direct and indirect job creation, community branding, etc.	
2.2	Review of Current System	Sustainable Water and Anderson Perry will provide a review and analysis of the current system	Sustainable Water/ Anderson Perry

2.2.1	*Review 2010 Wastewater Facilities Plan*	Review of current facilities plan and historical data related to the facility	
2.2.2	*Review Municipal Wastewater Flow Data*	Review of flow data for John Day and Canyon City, including water quality sampling and lab analysis as needed	
2.2.3	*Review Updated Treatment Plant Operational Data*	Analysis of energy utilization/costs, historical influent and effluent quality, chemical consumption, and operational costs	
3.0	**Preliminary Outreach** (Aug 2017 - Mar 2018)	Team kickoff meeting for the project team, preliminary site visits, and initial stakeholder engagement	Full Team
3.1	Team Kickoff	Initial meeting of relevant stakeholders in John Day	Full Team
3.2	Site Visits	Walk-through of existing plant and proposed sites as well as potential sites for consideration	Full Team
3.3	Stakeholder Engagement	Coordination with stakeholders including potential landowners, interested citizens, and hydroponics/ vertical farming industries	City of John Day
3.3.1	*Stakeholder Identification*	Identify relevant stakeholders across academic, industry, government, and community channels	
3.3.2	*Stakeholder Analysis*	Analyze stakeholder needs, priorities, concerns, and expectations	
3.3.3	*Strategic Communications Plan*	Develop a comprehensive method for communicating with each stakeholder in the time, place, and manner best suited to their needs	
4.0	**Regulatory Review** (Mar - Apr 2018)	Comprehensive analysis of regulatory environment, focusing on permitting requirements, environmental impacts, and Oregon statutes related to municipal corporations and available incentives	Full Team
4.1	Permitting Requirements	Review by permitting specialists to determine potential permitting pathways, difficulties with project permissions, and preliminary permitting costs for each option	Anderson Perry
4.2	Environmental Impacts	Review of current and projected environmental impacts and requirements from Federal Emergency Management Agency, Environmental Protection Agency, and other agencies; analysis of best practices in habitat restoration	Trout Unlimited
4.3	Municipal Corporations and Incentives	Review of current state policies related to enterprise funds and municipal corporations; identification of tax incentives and other options to encourage industry participation	John Day/ Academic Partners
5.0	**Feasibility Analysis Criteria** (Apr - Jul 2018)	Establish the criteria upon which the options will be evaluated and a final determination made	Full Team
5.1	Regulatory/Policy Criteria	Determine criteria for evaluating regulatory and policy impacts related to entity choice, reclaimed water uses, water rights, and water disposal requirements	Anderson Perry/John Day

5.1.1	*Hydroponics (Option 1)*	Identify effluent treatment class requirements; identify uses for reclaimed water and necessary volume for hydroponic growth/vertical farming	
5.1.2	*Irrigation (Option 2)*	Identify if property selected and/or alternatives provide sufficient space for water reuse at agronomic rates without adverse regulatory impacts	
5.2	Facility Design Criteria	Determine criteria to evaluate design options related to facilities, crop growth, and automation/IT for both reuse options	Sustainable Water/ Anderson Perry
5.2.1	*Hydroponics (Option 1)*	Identify greenhouse types, energy requirements, climate control options, fuel options, nutrient requirements, lighting, and automation systems	
5.2.2	*Irrigation (Option 2)*	Identify options and standards for irrigation, water delivery, and parts/service	
5.3	Building and Construction Criteria	Determine construction cost and evaluation criteria such as cost per square foot, per acre water treated, etc.	Sustainable Water/ Anderson Perry
5.3.1	*Hydroponics (Option 1)*	Identify construction costs based on various types of greenhouses, sizes, economics of scale, and cost per square foot for vertical farming	
5.3.2	*Irrigation (Option 2)*	Identify costs to construct various irrigation options in different locations/contractor availability	
5.4	Operations and Maintenance Criteria	Determine criteria to evaluate value of operating as a private enterprise, public-private partnership, or wholly public enterprise; determine criteria to evaluate life cycle operations	Sustainable Water/ Anderson Perry
5.4.1	*Hydroponics (Option 1)*	Identify costs related to entity choice and operating models, evaluate distribution costs and overhead expenses related to marketing/branding/administration; annual maintenance expenditures	
5.4.2	*Irrigation (Option 2)*	Identify operations and maintenance costs for publicly managed irrigation systems	
6.0	**Conceptual Design Development and Finance** (Jul - Sep 2018)	Preliminary siting, facility design, and process-related activities for both reuse options	Sustainable Water/ Anderson Perry /John Day
6.1	Design Charrette	Facilitate a preliminary siting and design charrette with applicable stakeholders and develop a conceptual basis of design for hydroponic treatment system	Sustainable Water/ Anderson Perry
6.1.1	*Hydraulic Capacity Analysis*	Evaluate hydraulic capacity and expenses related to both reuse options	

6.1.2	*Influent and Effluent Water Quality*	Establish standards and mechanisms to achieve appropriate influent and effluent quality for each stage in the process	
6.2	Reuse Scenarios	Scenario-based planning to analyze both reuse options	Sustainable Water/ Anderson Perry
6.3	Engineering and Construction Standards	Applicable standards for design and construction, including in 100-year floodplain	Sustainable Water/ Anderson Perry /John Day
6.4	Concept-level PFI&D	Process Flow, Instrumentation & Diagrams (PFI&D) for conceptual instrumentation of both reuse options	Sustainable Water/ Anderson Perry
6.5	Conceptual Site Plan and Facility Design	Develop preliminary treatment reactor sizing and conceptual reactor layout; develop concept-level site plan showing proposed reclaimed water storage, distribution, and reuse locations; develop 3D renderings of hydroponic treatment facility	Sustainable Water/ Anderson Perry
6.6	Life Cycle Economic Assessment	Assess local water and wastewater management costs and customer rates; develop a turnkey concept-level project construction budget for selected reuse scenarios; develop a concept-level operational budget; perform preliminary Life Cycle Economic Savings Analysis against baseline	Sustainable Water
7.0	**Final Report** (Sep - Dec 2018)	Preparation of final deliverables and communications with stakeholders/grant close-out	Full Team
7.1	Final Feasibility Study	Develop and print final deliverables including feasibility study, conceptual design, and life cycle economic assessment	Full Team
7.2	Selected Option	Communicate to all stakeholders, including community residents, the results of the feasibility study and selected option	John Day
7.3	Study Close-out	Close-out grant paperwork and memoranda of understanding	John Day

13. Key Task Scheduling:

Estimated duration of feasibility study: July 2017 to December 2018

Place an “X” in the appropriate column to indicate when each Key Task of the project would take place. Key tasks should match the key tasks listed as part of your response to the previous question.

Feasibility Study Key Tasks (Add additional rows as needed)	Grant year 2017				Grant year 2018				Grant year 2019			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Contract for Engineering/ Consulting Services	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐
2. Literature Review	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐
3. Preliminary Outreach	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐
4. Regulatory Review	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐
5. Feasibility Analysis Criteria	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐
6. Conceptual Design Development	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐
7. Final Report	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐

C. Permits and Authorizations

14. Provide a list of any permits and regulatory approvals needed to conduct the *feasibility study* and indicate the status of each in the table below. If permits/approvals are required, please submit copies of secured permits/approvals or describe efforts in securing necessary permits/approvals including current status. If permits/approvals are not required, provide explanation below.

Study Permit/ Regulatory Approval	Status and Efforts To Date

If no permits or authorizations are required for the study, please provide explanation:

Only authorization to access the potential properties is required, which is an informal process that is ongoing.

15. Provide a list of the permits and regulatory approvals that you anticipate would be needed to implement the project being studied.

Project Permit/Regulatory Approval
Land Acquisition
Land Use Compatibility Statement
Floodplain Development Permit
Site Plan Review
National Environmental Policy Act Compliance (If federal funding is obtained)

If permits/approvals are not required, please explain why and provide information regarding any State or Federal agencies contacted to verify this determination: _____

VI. Storage-Specific Questions

Instructions: If you indicated that your study is for a storage project, answer questions 16 and 17 in this section. If your study is for above-ground storage, also answer question 18. Please refer to the Storage-Specific Study Requirements: Application Guidance for guidance on completing this section. If your study is for a water conservation or reuse project, skip this section and proceed to Section VII.

16. Answer the following "Yes/No" questions about the storage project to be evaluated in the proposed study.

    A. Will the project divert more than 500 acre-feet of surface water annually? Yes ☐ No ☐

    B. Will the project impound surface water on a perennial stream? Yes ☐ No ☐

    C. Will the project divert water from a stream that supports sensitive, threatened or endangered species? Yes ☐ No ☐

    If you answered "yes" to any of the questions above, you are required to address the following analyses in your feasibility study. By signing this application, you are committing to include these required elements in your feasibility study.

    If you answered "yes" to (A), (B), or (C) above, attach a description of how you intend to address the following required elements in your feasibility study (please refer to the Storage-Specific Study Requirements: Application Guidance for guidance on these study requirements):

    i. Analyses of by-pass, optimum peak, flushing and other ecological flows of the affected stream and the impact of the storage project on those flows.
    ii. Comparative analyses of alternative means of supplying water, including but not limited to the costs and benefits of water conservation and efficiency alternatives and the extent to which long-term water supply needs may be met using those alternatives.
    iii. Analyses of environmental harm or impacts from the proposed storage project.
    iv. Evaluation of the need for and feasibility of using stored water to augment instream flows to conserve, maintain and enhance aquatic life, fish life and any other ecological values.
    v. For proposed storage projects for municipal use only – For a proposed storage project that is for municipal use, analysis of local and regional water demand and the proposed storage project's relationship to existing and planned water supply projects.

17. **For Above-Ground Storage Only:** Describe whether or not the storage project would include provisions for using stored water to augment instream flows to conserve, maintain and enhance aquatic life, fish life or other ecological values. As per statute and rule, above-ground storage projects that include these provisions receive preference for funding over other storage projects.

VII. Feasibility Study Budget

Instructions: Please answer the following questions about the study budget using the tables provided.

18. Please provide an estimated line item budget for the proposed feasibility study. Examples include: Direct project specific costs, such as in-house staff salary, contractual services, travel and administrative costs. See the Department's Budget Procedures and Allowable Costs document for further guidance.

OVERALL STUDY BUDGET Line Items	**Number of Units*** *(e.g. # of Hours)*	**Unit Cost** *(e.g. hourly rate)*	**In-Kind Match**	**Cash Match Funds**	**OWRD Grant Funds**	**Total Cost**
Staff Salary/Benefits	349	43	15,000			15,000
Contractual/Consulting	857	105	0	40,000	50,000	90,000
Equipment (must be approved)						
Supplies						
Travel						
Other:						
Administrative Costs**	116	43	5,000			5,000
		Total	**20,000**	**40,000**	**50,000**	**110,000**

** The "Unit" should be per "hour" or "day" – not per "project" or "contract." Units x Unit Costs = Total Cost*
*** Administrative Costs may not exceed 10% of the total funding requested from the Department*

19. If Grant amount requested is $50,000 or greater, identify the budget for each key task below. Key Tasks identified below should be the same as the Key Tasks identified in Questions 12 and 13.

Feasibility Study Key Tasks	**In-Kind Match**	**Cash Match Funds**	**OWRD Grant Funds**	**Total Cost**
1.0 Contract for Engineering/ Consulting Services	*2,500*		*2,500*	*5,000*
2.0 Literature Review	*2,500*		*5,000*	*7,500*
3.0 Preliminary Outreach	*2,500*		*2,500*	*5,000*
4.0 Regulatory Review	*2,500*	*8,000*	*8,000*	*18,500*
5.0 Feasibility Analysis Criteria	*2,500*	*10,000*	*10,000*	*22,500*
6.0 Conceptual Design Development	*2,500*	*20,000*	*20,000*	*42,500*
7.0 Final Report	*5,000*	*2,000*	*2,000*	*9,000*
Total	**20,000**	**40,000**	**50,000**	**110,000**

VIII. Match Funding

Instructions: Please answer the following question regarding matching funds.

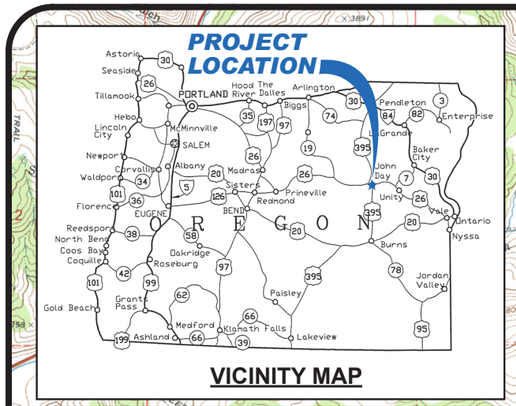
20. Please fill out the table below and attach the appropriate documentation for both the secured and pending match. Keep in mind that applicants must demonstrate a minimum **dollar-for-dollar match**. Please note that a failure to meet this requirement or to attach documentation will result in an incomplete application that will not be considered for funding.

    For secured funding, you must ***attach a letter of support*** from the match funding source that specifically mentions the dollar amount identified for this study and as shown in the "Amount/Dollar Value" column in the table below.

    For pending resources, ***other written documentation showing a request*** for the matching funds must accompany the application.

Match Funding Source (if in-kind, briefly describe the nature of the contribution)	**Type (✓ One)**	**Status (✓ One)**	**Amount/ Dollar Value**	**Date Match Funds Available** *(Month/Year)*
IFA Technical Assistance Grant (see Attachment 4)	☒cash ☐in-kind	☐secured ☒pending	20,000	June 2017
City of John Day	☒cash ☐in-kind	☒secured ☐pending	20,000	October 2016
City of John Day	☐cash ☒in-kind	☒secured ☐pending	20,000	October 2016
	☐cash ☐in-kind	☐secured ☐pending		
	☐cash ☐in-kind	☐secured ☐pending		
	☐cash ☐in-kind	☐secured ☐pending		
	☐cash ☐in-kind	☐secured ☐pending		

FIGURES



VICINITY MAP

WASTEWATER IRRIGATION OPTION
SEE FIGURE 3

HYDROPONIC OPTION
SEE FIGURE 2

EXISTING WASTEWATER TREATMENT FACILITIES PLANT (LAT. 44°25'22.29"N, LONG. 118°57'31.41"W)

JOHN DAY

CANYON CITY

URBAN GROWTH BOUNDARY

CITY LIMITS

To Mt. Vernon

U.S. HWY. 395/26

U.S. HWY. 26

To Prairie City

U.S. HWY. 395

To Burns

T. 13-14 S., R. 31-32 E. W.M.

SCALE IN FEET
3000 0 3000

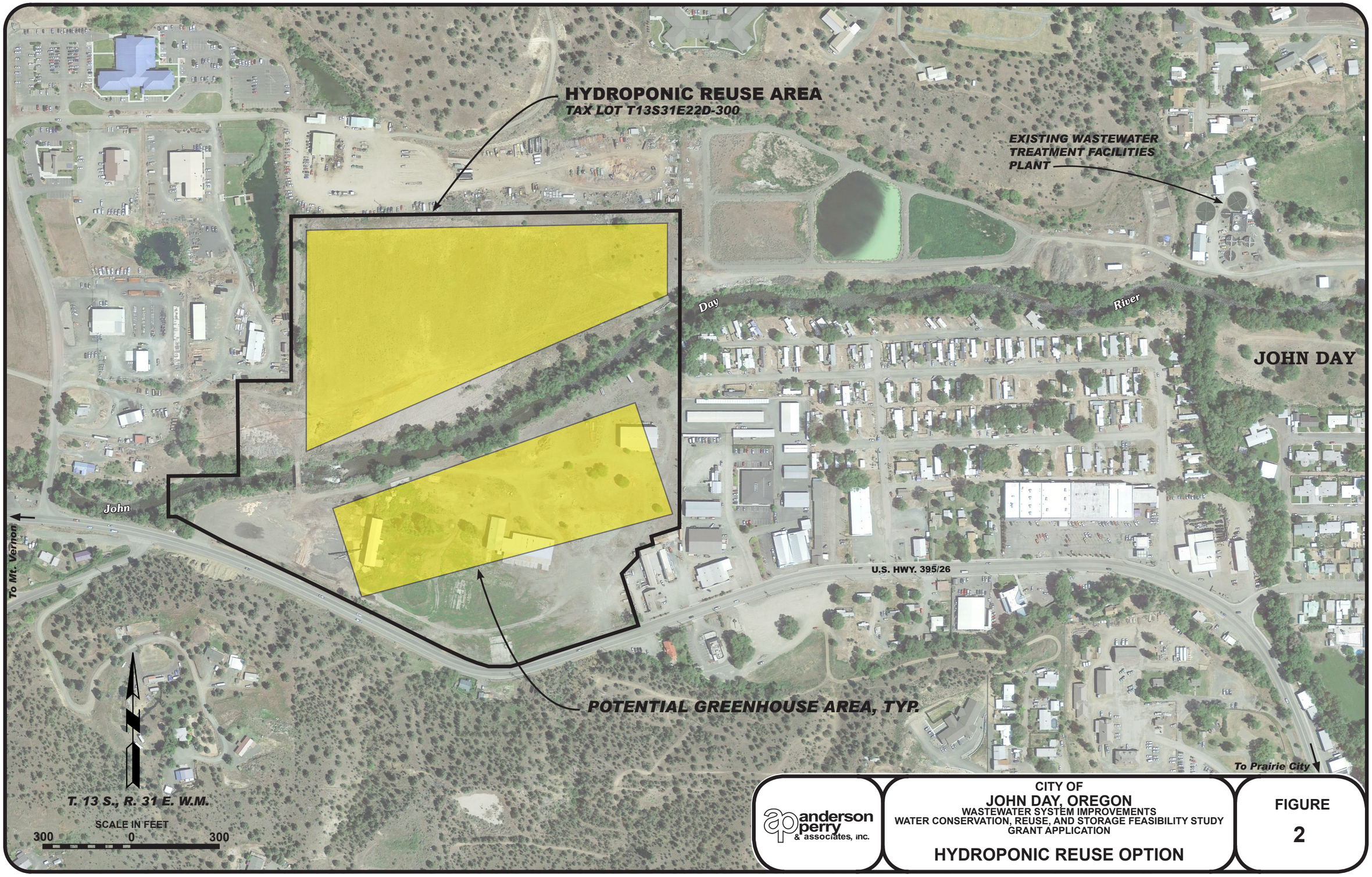
anderson perry & associates, inc.

CITY OF
JOHN DAY, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
WATER CONSERVATION, REUSE, AND STORAGE FEASIBILITY STUDY
GRANT APPLICATION

LOCATION AND VICINITY MAPS

FIGURE 1

Job# 592-26-030 Oct. 5, 2016 lbauer



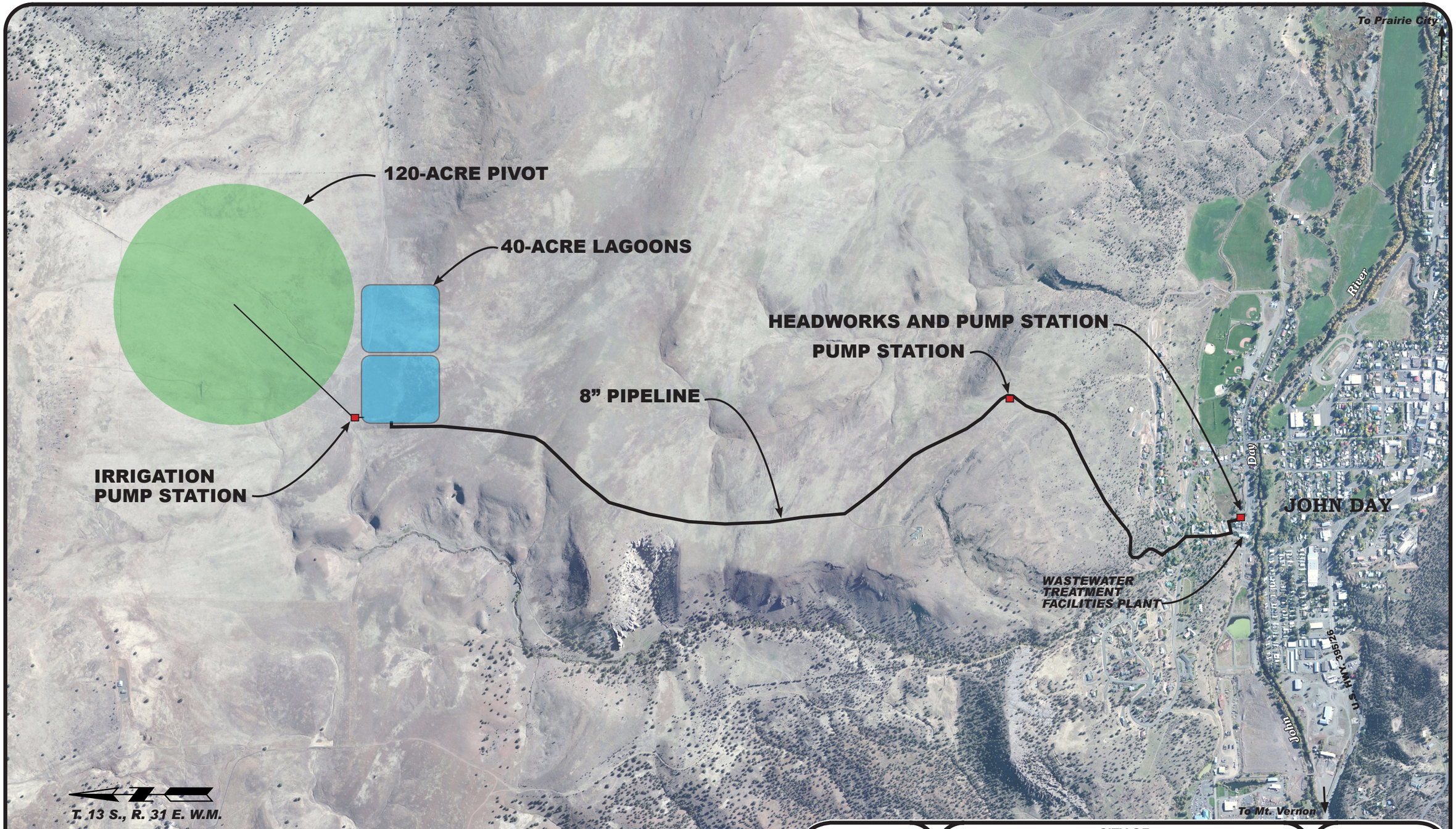
anderson perry & associates, inc.

CITY OF
JOHN DAY, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
WATER CONSERVATION, REUSE, AND STORAGE FEASIBILITY STUDY
GRANT APPLICATION

HYDROPONIC REUSE OPTION

FIGURE 2

Job# 592-26-030 Oct. 5, 2016 lbauer



CITY OF
JOHN DAY, OREGON
WASTEWATER SYSTEM IMPROVEMENTS
WATER CONSERVATION, REUSE, AND STORAGE FEASIBILITY STUDY
GRANT APPLICATION

WASTEWATER IRRIGATION OPTION

anderson perry & associates, inc.

FIGURE
3

Job# 592-26-030 Oct. 5, 2016 lbauer

LETTERS OF SUPPORT

CITY OF JOHN DAY

Phone (541) 575-0028
Fax (541) 575-3668

450 East Main Street
John Day, Oregon 97845

October 11, 2016

Jon Unger, Water Resources Grant Administrator
Oregon Water Resources Department
725 Summer Street N.E., Suite A
Salem, Oregon 97301

RE: John Day Water Reuse Feasibility Study - Water Conservation, Reuse, and Storage Feasibility Study Grant Program

Dear Oregon Water Resources Department Review Team:

The John Day City Council endorses this application to conduct a Water Reuse Feasibility Study. The purpose of the Study is to complete an assessment of potential industrial and agricultural uses for reclaimed water generated by our proposed new wastewater treatment facility.

Replacing our outdated treatment plant is a top priority for this Council. We completed a Wastewater Facilities Plan in 2009 using Anderson Perry as our engineering consultant. In conjunction with the Plan we completed a System Development Charge (SDC) study and began incrementally raising our sewer rates (currently at $44 per residential connection) in order to qualify for competitive financing of our new treatment plant.

The City has established a Joint Sewer Facility Fund (Fund 04) to operate and maintain the current treatment plant and invest in professional services for the new treatment facility. Fund 04 has secure funding for FY17 of $15,794 for materials and services. The Council commits to budgeting and allocating an appropriate amount of funding for FY17 and FY18 as needed to meet our cash contribution for this grant. In addition, the City Manager is an experienced consultant with more than ten years of technical and scientific advisory experience in the private sector and can contribute up to $10,000 annually as in-kind labor for technical support.

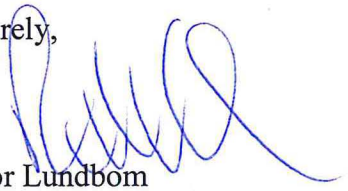
The new treatment plant is the most significant capital investment our City will make in 50 years. We are committed to finding a solution that will enable us to monetize our wastewater – creating a reusable asset for the City to help offset future operations and maintenance expenses. We are committed to finding a sustainable solution that preserves the water quality of the John Day River Basin and indigenous salmonid habitat. Finally, we are committed to exploring options that will allow us to invest in our own economy through the use of public private partnerships, forward-looking design features, and creative water reuse strategies.

John Day is the largest of the nine incorporated cities that make up Grant County. The County looks to the City of John Day for economic leadership and as a regional service provider. The

City accommodates the largest employers in the County and currently services the wastewater treatment needs for the largest metropolitan area (approximately 2,500 residents). Funding from this feasibility study will position us to determine which type of future treatment plant will have the highest economic value, will be financially achievable given our geographic and fiscal constraints, and will position us to continue our leadership role in the region.

We strongly endorse this proposal and will lend our full support to ensuring the feasibility study is completed in a timely and cost-effective manner.

Sincerely,



Mayor Lundbom

By unanimous motion of the City Council, 11 October 2016.

County Court of Grant County
Judge Scott W. Myers
Commissioner Chris B. Labhart
Commissioner Boyd Britton

October 5, 2016

Jon Unger, Water Resources Grant Administrator
Oregon Water Resources Department
725 Summer Street N.E., Suite A
Salem, Oregon 97301

RE: John Day Water Reuse Feasibility Study - Water Conservation, Reuse, and Storage Feasibility Study Grant Program

Dear Oregon Water Resources Department Review Team:

The Grant County Court supports the John Day application for grant funding to conduct a Water Reuse Feasibility Study. The purpose of the Study is to complete an assessment of potential industrial and agricultural uses for reclaimed water generated by the proposed John Day / Canyon City Wastewater Treatment Facility.

The City of John Day maintains a regional wastewater treatment facility that services the City of John Day, Canyon City (the County Seat), and the Urban Growth Boundary between and adjacent to these cities. The existing facility is a mechanical treatment plant that was built in 1949 and upgraded in 1978. Periodic reinvestments have been made to maintain the facility, but it is now past its useful life and must be replaced.

The City of John Day has proposed to invest in a new treatment plant that will accomplish three goals:

1) Reclaim up to 100% of the wastewater currently generated in the area (200,000 gallons per day)
2) Eliminate direct and indirect discharge into the John Day River
3) Reuse the water as an asset to reinvest in our economy, creating new jobs in a growing industry

John Day intends to use this grant to explore the feasibility of applying reclaimed water for use in controlled environment agriculture – specifically using hydroponic technology in conjunction with the new treatment plant to grow cash crops for export. Hydroponics is a growing industry that recognizes the importance of water reuse and conservation. Crops as diverse as bamboo,

flowers, lavender, ornamental grasses, medicinal herbs, and processed plant derivatives can be grown in reclaimed water, harvested and exported.

Grant County currently has the highest unemployment rate in the State (8% as of August 2016) and continues to experience a loss in our labor force participation rate and declines in the size of our labor force. The County's population is also trending slowly downward and is projected by Portland State University to continue in population decline for the foreseeable future.

Entrepreneurial efforts to create a new and emerging business in our County are an important first step toward developing a more diversified economy and reversing the trend of population decline and unemployment we are experiencing. In addition to its economic benefits, this proposal will help reduce and potentially eliminate discharge into the John Day River, helping to restore fish and wildlife habitat.

The Grant County Court supports this Study and will continue to participate in the planning process as this project moves forward.

Sincerely,

Scott W. Myers	Chris B. Labhart	Boyd Britton
County Judge	Commissioner	Commissioner

cc: OWRD, Jon.J.Unger@wrd.state.or.us

Sustainable Water
4860 Cox Rd., Suite 120
Glen Allen, VA 23060
804.965-5590
www.sustainablewater.com

October 5, 2016

Jon Unger, Water Resources Grant Administrator
Oregon Water Resources Department
725 Summer Street N.E., Suite A
Salem, Oregon 97301

RE: John Day Water Reuse Feasibility Study - Water Conservation, Reuse, and Storage Feasibility Study Grant Program

Dear Oregon Water Resources Department Review Team:

Sustainable Water supports the John Day application for grant funding to conduct a Water Reuse Feasibility Study. The purpose of the Study is to complete an assessment of potential industrial and agricultural uses for reclaimed water generated by the proposed John Day Wastewater Treatment Facility.

Sustainable Water is a leading force in water reclamation and reuse solutions across the United States. As part of the White House Water Summit, Sustainable Water has committed to developing 50 eco-engineered decentralized water reclamation and reuse systems across governmental, institutional, and commercial market sectors.

Sustainable Water is coordinating with John Day on a proposal to replace its current wastewater treatment facility, adjacent to the John Day River, with a new facility designed by Sustainable Water. The new treatment plant will:

- Maximize recycled water use on-site (up to 200,000 gallons per day);
- Minimize or eliminate wastewater discharge into the John Day River system;
- Improve the built and natural watershed in the region;
- Create long-term cost savings for facility operations;
- Alleviate the cost burden on the community; and
- Advance research and development for water reuse.

John Day will use this grant to explore the feasibility of using reclaimed water in controlled environment agriculture – specifically using hydroponics technology to grow cash crops for export. The Study will help to identify whether water reclamation and reuse in this industry is a viable investment for the community and which community stakeholders (universities, private industries and non-profit organizations) to partner with should the implementation prove feasible.

Sustainable Water supports this Study and will continue to participate in the planning process as this project moves forward.

Sincerely,

Bob Salvatelli
Director of Sales, Sustainable Water

October 11, 2016

Jon Unger, Water Resources Grant Administrator
Oregon Water Resources Department
725 Summer Street N.E., Suite A
Salem, Oregon 97301

RE: John Day Water Reuse Feasibility Study - Water Conservation, Reuse, and Storage Feasibility Study Grant Program

Dear Oregon Water Resources Department Review Team:

Trout Unlimited supports the John Day application for grant funding to conduct a Water Reuse Feasibility Study. The purpose of the Study is to complete an assessment of potential uses for reclaimed water generated by the proposed John Day / Canyon City Wastewater Treatment Facility.

The City of John Day regional wastewater treatment facility services a population of 2,500 residents living in the area of John Day and Canyon City in Grant County, Oregon. The current facility produces over 73 million gallons of wastewater annually that is indirectly discharged into the John Day River.

The City of John Day has proposed to invest in a new treatment plant that will eliminate direct and indirect discharge into the John Day River through water reclamation. This feasibility study will help determine if viable economic uses for the wastewater can be identified.

Trout Unlimited is a national organization with more than 150,000 members organized into about 400 chapters from Maine to Montana to Alaska. Our mission is to conserve, protect and restore North America's coldwater fisheries and their watersheds. We believe that conservation should be a true partnership between landowners, agencies, municipalities, and all stakeholders. We work to protect critical habitat, to reconnect degraded waterways, and restore populations to coldwater fisheries. Restoring river ecosystems and natural habitat in the John Day River is a critical part of our conservation work.

Trout Unlimited supports this Study and will continue to participate with John Day in the planning process as this project moves forward.

Sincerely,

Dwayne Meadows
Pacific Northwest Outreach Coordinator
Canyon City, OR 97820

cc: OWRD, Jon.J.Unger@wrd.state.or.us

ATTACHMENT 1
Memorandum Regarding Option 1

CITY OF JOHN DAY

MEMORANDUM

TO:	JOHN DAY CITY COUNCIL
FROM:	NICHOLAS GREEN, CITY MANAGER
SUBJECT:	WASTE WATER TREATMENT FACILITY – PROGRESS UPDATE
DATE:	AUGUST 23, 2016
CC:	TODD HESSE, DEQ

EXECUTIVE SUMMARY

This memo provides background information on the City of John Day's existing waste water treatment facility (WWTF) and progress on upgrading to a new WWTF.

BACKGROUND

Construction of the City's original wastewater collection system began in 1949. Major additions were completed in 1970 and 1978. Since 1978 the system has been expanded several times to support the City's needs and to keep the facility in operating condition.

The existing WWTF is located on the northwestern end of the City at the end of 7th street. It consists of a mechanical plant including influent lift station, headworks structure, two (2) primary clarifiers, two (2) trickling filters, one (1) secondary clarifier, gas chlorination and a chlorine contact basin. Following treatment, secondary effluent flows by gravity to four (4) percolation ponds for disposal. The ponds are located on the north side of the John Day River, with approximately 80 feet of separation. The dry weather design flow of the current facility is 0.6 million gallons per day (MGD).

The City of John Day contracted with Anderson Perry & Associates in 2008 to develop a new Wastewater Facilities Plan to evaluate the existing wastewater treatment facilities, potential improvements, and means of financing an improvements project. On August 26th, 2008, the City Council moved to construct a new WWTF at the site of the existing plant after reviewing the results of the study.

As reported by Anderson Perry, the average daily flow at the facility from 2001-2008 was 0.240 MGD, with a maximum daily flow of 0.840 MGD on May 20th, 2008, and a minimum daily flow of 0.115 MGD on September 25th, 2005. In the eight years since that study, the average daily flow has decreased slightly to 0.232 MGD, with peak flows occurring during the flooding of May 2011 at 1.79 MGD.

The year 2011 total estimated cost for the project proposed by Anderson Perry and adopted by the Council was $8.29M. The Plan called for construction of a new activated sludge treatment facility with continued discharge into the existing percolation ponds. This proposal necessitated increasing the level of treatment needed to meet current and future permitting requirements and included a new lift station; new activated sludge treatment process; a new UV light disinfection system; two (2) aerobic digesters for sludge treatment; new yard and process piping including a

grit removal system; new electrical, instrumentation, and controls; a new operations building and blower/generator/electrical building; and associated demolition, site work and landscaping.

CURRENT STATUS

Several assumptions made in the 2008 Plan may no longer apply, including the projected population growth, technological advances since 2008, the continued dependence on percolation ponds for the effluent, the exclusion of a lagoon-based option, and the projected costs of the facility.

The estimated population of John Day in 2008 was 1,845 residents. From 1960 to 2008, the population fluctuated from a low of 1,520 residents in 1960 to a high of 2,012 in 1980. As the City currently treats wastewater from Canyon City, their population statistics were also included in the Plan. Canyon city's population in July 2008 was estimated at 675 residents, up from its 1970 low of 600 residents. At a 2% projected population growth rate, the combined population of both cities in 2030 was estimated to be 3,819 people. However, the real population statistics for John Day show the city's population has declined by 16.5 percent (-0.48% annually) from its 1980 peak to its present population of 1,680. Based on these data, it is unlikely that this area will reach the 2030 population projection. The City needs to address the possibility that without aggressive intervention, the City's population may continue to decline and its economy continue to stagnate well into the future.

Given these considerations, the Plan should be revised to include a treatment approach that is scalable. This would require a facility design that is based on the city's current population and utilization rates, but which has the ability to be expanded and scaled to allow for future growth. This is especially important as the Canyon City Council has publicly stated their intent to pursue their own wastewater treatment solution in the future. Were this to take place, the volume of influent treated by the new WWTF would decrease by approximately 15 percent.

Emerging technology since 2008 also warrants an update to the Plan. New WWTF options include systems that use hydroponically grown greenery for secondary treatment of effluent. Cost-benefit analysis has shown these types of systems may have a higher societal net present benefit than conventional activated sludge facilities.[1] Hydroponics WWTFs are currently in use in both Europe and the United States. The most recent example is the WaterHub system in Atlanta, GA, which uses hydroponically grown plants to recycle up to 400,000 gallons of water per day. This type of solution could be scaled to meet future demand, would create a renewable asset in the form of reclaimed water for land-application, and could be coupled with a controlled environment agriculture (CEA) industry using ancillary greenhouses to grow cash crops for export.

Finally, the volume of reclaimed effluent may warrant reconsideration of a lagoon-based system to store excess effluent that may not be immediately usable. For example, some winter effluent could be stored for use over the summer if the hydroponic system can't beneficially use all of the reclaimed water year round.

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[1] E. Schrammel, *A Cost Benefit Analysis of Hydroponic wastewater treatment in Sweden,* Uppsala 2014.

Given the scale of the proposed investment for a new WWTF, it is in the best interests of the City to evaluate the technical feasibility, costs and benefits of a hydroponics WWTF option, while concurrently updating the planning assumptions and costs associated with the option selected in the 2008 Plan.

HYDROPONIC WWTF CONCEPTUAL FRAMEWORK

A commercial-scale water reclamation and reuse system harvests water directly from the City's sewer system and "utilizes co-engineered processes to treat the wastewater for beneficial reuse."[2] The WaterHub system in Atlanta (Figure 1) reclaims up to two-thirds of the treatment area's wastewater for commercial and industrial use, and also provides a state-of-the-art research facility for hydroponic horticulture.

Figure 1. Emory University's WaterHub, a production-scale greenhouse used to hydroponically treat wastewater effluent

A similar system in John Day could produce reclaimed water for a variety of uses, including CEA, irrigation and landscaping, and utility operations. It also has the potential to create economic value by scaling the greenhouses used for effluent treatment to grow cash crops for manufacturing and export. These crops could include bamboo, flowers, lavender, ornamental grasses, medicinal herbs, and processed plant derivatives for personal hygiene products, clothing and textiles, and essential oils.

A diagram of the hydroponics WWTF conceptual framework is shown in Figure 2. This framework rests on three integrated pillars that support the overall framework: 1) Wastewater reclamation; 2) Controlled environment agriculture; and 3) Renewable energy resources.

Wastewater reclamation. Wastewater reclamation is accomplished through the treatment process. The WaterHub treatment facility uses an 11-stage process that includes a rotary screen, anoxic moving bed bioreactors, aerobic moving bed bioreactors, hydroponic reactors, a clarifier tank, disk filter, ultraviolet disinfection, a 50,000 gallon storage tank for reclaimed water,

[2] http://sustainablewater.com/why-reuse-water/

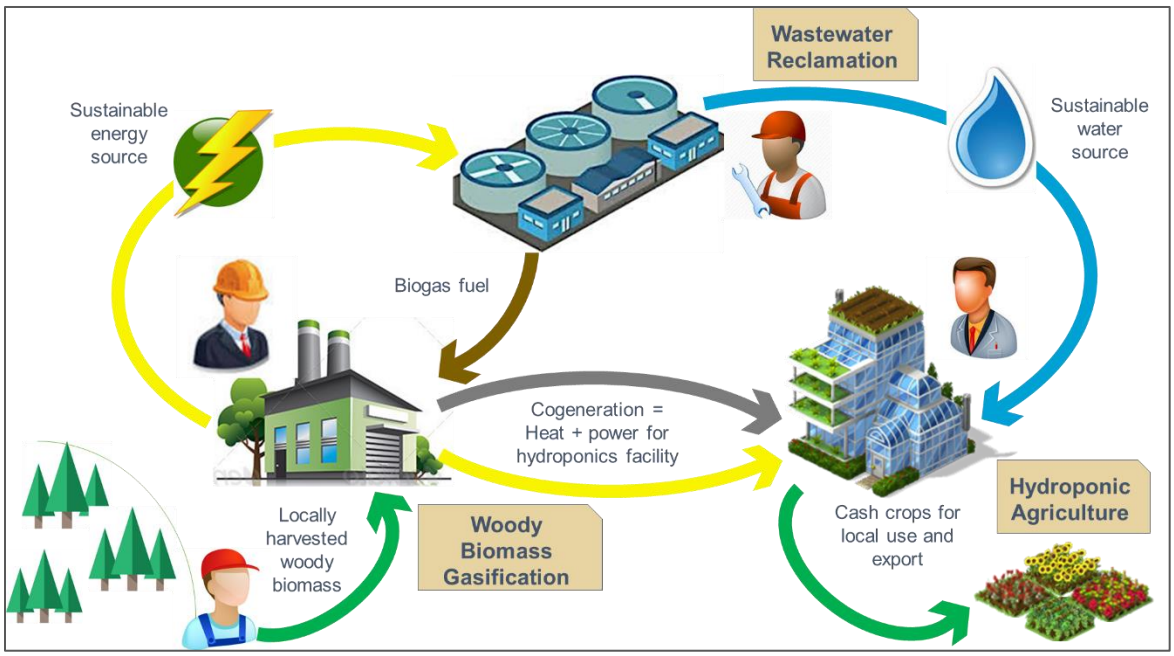


Figure 2. Conceptual Framework for a Hydroponics Wastewater Treatment Facility in John Day, OR

and an end-stage distribution system to transfer the reclaimed water. John Day would need to explore a range of preliminary design options in order to select a treatment process tailored to the city's needs and unique circumstances should the Facility Plan level analysis indicate this is a viable wastewater treatment option. Alternatively, the City can explore privatizing this portion of the system through a long-term water repurchasing agreement with Sustainable Water, the company that designed and financed the WaterHub facility. Sustainable Water designs, builds, operates, maintains and finances the facility in exchange for a 40-year water repurchasing agreement. City Manager Green has contacted Sustainable Water to determine if this is a viable option for John Day.

Controlled Environment Agriculture. Water from the treatment facility is fed into the CEA greenhouses where cash crops are cultivated hydroponically for local use and export. This portion of the system could be managed as a public enterprise, a private enterprise, or as a public private partnership (P3) between the City, a state university, and private growers. It could also include both crop growth and subsequent processing (i.e. processing flowers into essential oils) such that the exports are manufactured goods. The most viable approach for this phase of the process may be to use the "test-validate-scale" methodology, where a test facility (apx. 2500 sq. ft.) is used to experiment with various growth parameters and crop types, the "validate" facilities (apx. 10,000 square feet) are pilot-scale greenhouses that are used to grow the most promising crops, and the "scale" facilities (>10,000 sq. ft) are used for industrial-scale agricultural production of the crops that produce the highest economic value. A cost-benefit analysis may be needed to determine the highest benefit applications for the reclaimed water.

Renewable Energy Resources. Biomass removal efforts from the Malheur National Forest Stewardship contract could be coupled with the WWTF by utilizing biomass as a renewable energy source. Discussions have also occurred about the use of torrefied biomass as an

advanced biomass fuel that can be used as a direct coal replacement in power plants or industrial facilities like the WWTF, with a future facility proposed in or near John Day or Prairie City.[3] Other renewable energy resources that could be explored include fats, oils and grease (FOG) for biogas as well as solar arrays.

ECONOMIC BENEFITS

A new WWTF that takes advantage of economies of scale and forward-looking design innovations has the potential to create new jobs and an entirely new industry in John Day, while simultaneously bolstering existing industries. This would create multi-dimensional economic benefits. The City could also be eligible for multiple low interest loans and grants related to Rural Business Services, including Rural Business Enterprise Grants (RBEG), Rural Business Opportunity Grants (RBOG), the Renewable Energy for America Program (REAP), as well as Rural Economic Development Loans (REDL) and Rural Economic Development Grants (REDG).[4]

Additionally, as cash crops are harvested and sold as exports, the revenue generated from those crops can be used to further offset the operations and maintenance costs of the facility, as a revenue source for future capital improvements, or to reduce the annual sewer rates charged to residents.

PROJECT FINANCING

The 2008 Plan included a range of cost scenarios for the proposed $8.29M facility. Based on the Plan, if the City were to fund the new facility without any grants and without Canyon City contributing any funds to the project, monthly sewer rates would need to be raised to approximately $64-68. Were the City to finance the project through property tax increases under the same set of assumptions, the City would need to raise taxes to approximately $5.50 to $8 per $1,000 assessed value. A new set of cost assumptions based on the hydroponics facility design will need to be analyzed.

The City would also benefit from conducting its own population and income survey of residents. The 2014 American Community Survey (ACS) population estimate for John Day was 1,663 residents, with a median household income of $32,614. The median income for the state was $50,521 for the same period. Census data are often overestimated and are frequently computed for small communities. By conducting its own survey, the City may become eligible for better financing options.

The main utility funding agencies in the state of Oregon are:

- US Department of Agriculture's Rural Development Program (USDA RD)
- Oregon Business Development Department's Infrastructure Finance Authority (IFA)

---

[3] Oregon Torrefaction, LLC Request for Proposals, 2016. See also www.oregontorrefaction.com/torrefaction.html
[4] USDA Rural Business Services website, 2016.

- Oregon Department of Environmental Quality's Clean Water State Revolving Loan (CWSRF)

The Rural Community Assistance Corporation (RCAC) also offers funding, but is not as significant a source of funding as the above programs. BPA Energy Smart Industrial (ESI) program also offers varying levels of assistance based on the power consumption of the utility.

REGULATORY ENVIRONMENT

WPCF vs. NPDES Permits. The current WWTF was covered under an industrial Water Pollution Control Facilities (WPCF) permit from the State of Oregon that expired in 2007. The facility is currently under Administrative Review by the Oregon Department of Environment Quality (DEQ). Although the current WWTF is effecting sufficient treatment now to meet permit limits, the facility is approaching the end of its useful life; and due to the proximity of the percolation ponds to the John Day River, continued coverage under a WPCF for the existing facility may not be possible. This would require the facility to be covered by a National Pollutant Discharge Elimination System (NPDES) permit issued by DEQ.

The location of the existing percolation ponds right next to a receiving water means an almost certain subsurface hydrologic connection that would be more appropriately permitted with an NPDES permit. While there is ample area for land application outside of the John Day River Valley, transporting the effluent would mean high pumping costs to get it over the ridge and out of the valley.

Discharge of the treated effluent can generally either go to the river (NPDES permit) or land application (WPCF permit). Due to the nature of NDPES permits and the potential for increasingly stringent permit effluent limits, land application may be advantageous (i.e. less resource requirements) relative to discharge to a receiving water. The proposed hydroponics facility would likely meet the WPCF permit requirements and would enable the City to transition away from discharge to the river by using the reclaimed water in a CEA environment or for other land application uses. Exhibit 1 provides a summary of water reuse requirements for Oregon.

Floodplain Building Restrictions. Goal 7 of Oregon's Department of Land Conservation and Development (DLCD) states "*Local governments shall adopt comprehensive plans (inventories, policies and implementing measures) to reduce risk to people and property from natural hazards. 2. Natural hazards for purposes of this goal are: floods (coastal and riverine), landslides, earthquakes and related hazards, tsunamis, coastal erosion, and wildfires. Local governments may identify and plan for other natural hazards."*

While this doesn't specifically preclude wastewater storage lagoons in a 100-year flood plain, it clearly discourages locating structures in areas that are prone to flood damage. The additional consideration of stored wastewater makes storage lagoons in flood plain a public health issue as well. Any future designs for the WWTF and storage for reclaimed water will have to take floodplain mitigation and compliance into consideration.

The site of the existing WWTF occupies 22.5 acres of land on tax lots 101, 200, and 2500, of 13S31E22D; and lots 700 and 1402 of 13S31E23CB. There is also a 50-acre parcel adjacent to

the City-owned property that is zoned industrial and could potentially be leased to the City for the new facility, however, tax lot 300 is in the county General Industrial Zone and the John Day Urban Growth Boundary and would require development approval through Grant County (see Exhibit 2 for floodplain maps).

NEXT STEPS

The City should proceed on two fronts: 1) developing a preferred alternative for a WWTF project; and 2) investigating project financing options.

- Because the 2008 Plan did not develop the hydroponics option or look at the lagoon alternative for storage of reclaimed water, these elements will need to be added as an addendum to the Plan, along with updated cost projections on the 2008 facility options.

- A Literature Review and Income / Population survey may be needed to ensure the City is using the most accurate data for the design options and financing.

- City Manager Green will coordinate with DEQ, Sustainable Water, Anderson Perry and other stakeholders to develop a project scope and timeline for the Council.

SUMMARY

The City of John Day has a unique opportunity to make a capital improvement that will set a new standard for renewable and sustainable innovation in the state of Oregon. The proposal has the potential to create a new industry in John Day along with associated job growth, while simultaneously off-setting the costs to finance, operate and maintain a new WWTF. Given these potential benefits, an update to the 2008 Plan is warranted before the City proceeds with this capital investment.

Exhibit 1. Summary of Water Reuse Requirements for Oregon State

The following table summarizes key requirements of Oregon Administrative Rules (OARs) Division 55 Recycled Water Use.[5] Not all requirements or information from OARS 55 is contained in the table. For more detailed information on requirements for beneficial use of recycled water please see OARS Division 55 available through footnote reference.

Requirement	Non-disinfected wastewater	Wastewater Class			
		D	C	B	A
Treatment	oxidized	Oxidized & disinfected	Oxidized & disinfected	Oxidized & disinfected	Oxidized, filtered & disinfected
Criteria	none	must not exceed a 30-day log mean of 126 E. coli organisms per 100 milliliters and 406 E. coli organisms per 100 milliliters in any single sample	must not exceed a median of 23 total coliform organisms per 100 milliliters, based on results of the last seven days that analyses have been completed, and 240 total coliform organisms per 100 milliliters in any two consecutive samples	must not exceed a median of 2.2 total coliform organisms per 100 milliliters, based on results of the last seven days that analyses have been completed, and 23 total coliform organisms per 100 milliliters in any single sample	must not exceed a median of 2.2 total coliform organisms per 100 milliliters, based on results of the last seven days that analyses have been completed, and 23 total coliform organisms per 100 milliliters in any single sample. ***Turbidity limits not provided here.***
Crops[1]	Fodder for animals, timber	Firewood, ornamental nursery stock, Christmas trees, sod, pasture for animals	Processed food crops, vineyards is wastewater applied directly to soil, landscaping,	Crops as allowed for class C, some non-crop uses allowed	any agricultural or horticultural use

[5] (http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_340/340_055.html)

Monitoring	Per permit requirements, not specified in OARS	Monitoring for E. coli organisms must occur once per week at a minimum	Monitoring for E. coli organisms must occur once per week at a minimum	Monitoring for total coliform organisms must occur three times per week at a minimum	Monitoring for total coliform organisms must occur once per day at a minimum. Hourly monitoring for turbidity.
Setback[2] (distances are the minimum requirement)	150 feet between irrigation and human water supply source, setbacks for public health and environment defined in permit	100 feet between irrigation and property line for sprinklers 100 feet between irrigation and human water supply source	70 feet between irrigation and property line for sprinklers 100 feet between irrigation and human water supply source	50 feet between irrigation and property line for sprinklers 10 feet between irrigation and human water supply source	Setback distances for food prep or drinking fountains only (no contact allowed)
Access	Public access must be prevented	Milk producing animals may not come in contact with wastewater Personnel at use area must be notified of the type of irrigation water	Landscape irrigation must prevent public from contacting wastewater Public notice required when using for agricultural purposes and sprinklers used	Personnel and public notice required when using for agricultural purposes and sprinklers used Pubic must be restricted from direct contact with wastewater	Personnel and public notice required when using for agricultural purposes and sprinklers used
Management (signage required for some uses, this does not include crops on private property)	Irrigation with recycled water is prohibited for 30 days before harvesting. Sprinkler irrigation is prohibited unless adequate	No irrigation 3 days before harvesting crops	No irrigation 3 days before harvesting processed food crops Edible portion of orchard or vineyard crops cannot contact the ground	No irrigation 3 days before harvesting processed food crops Edible portion of orchard or vineyard crops cannot contact the ground	No requirements / restrictions for crop use on private property

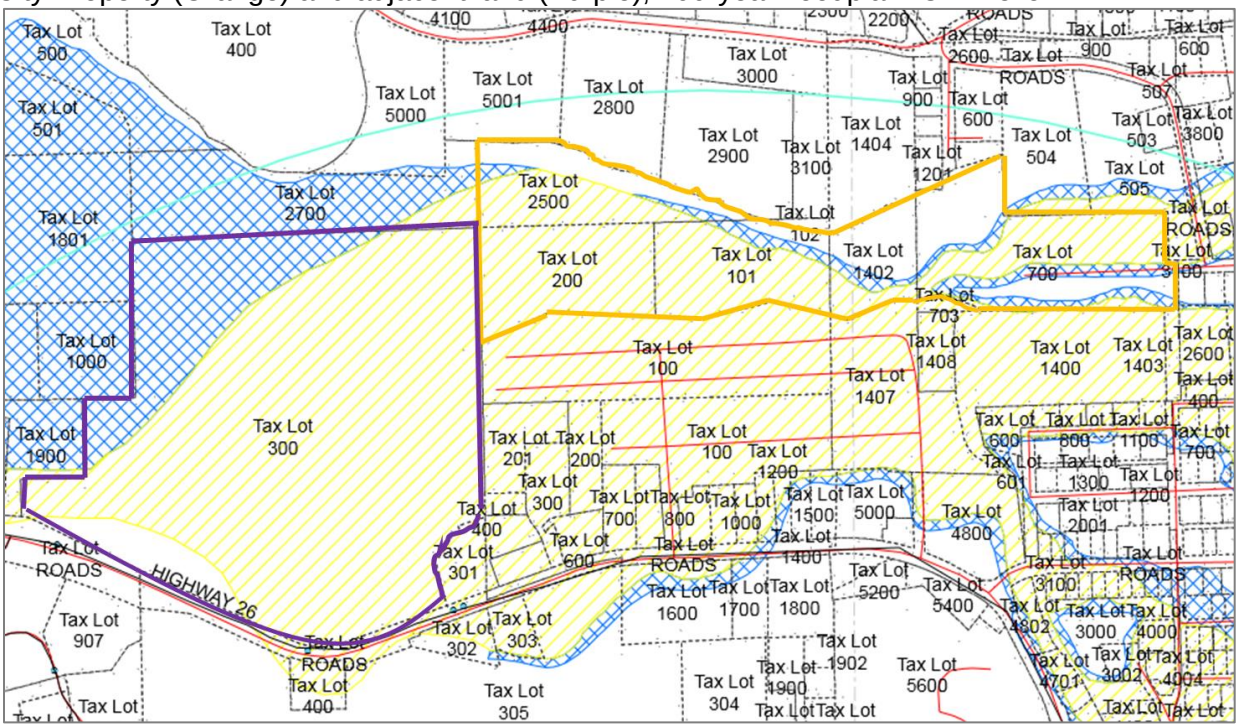
	protection from aerosols.				

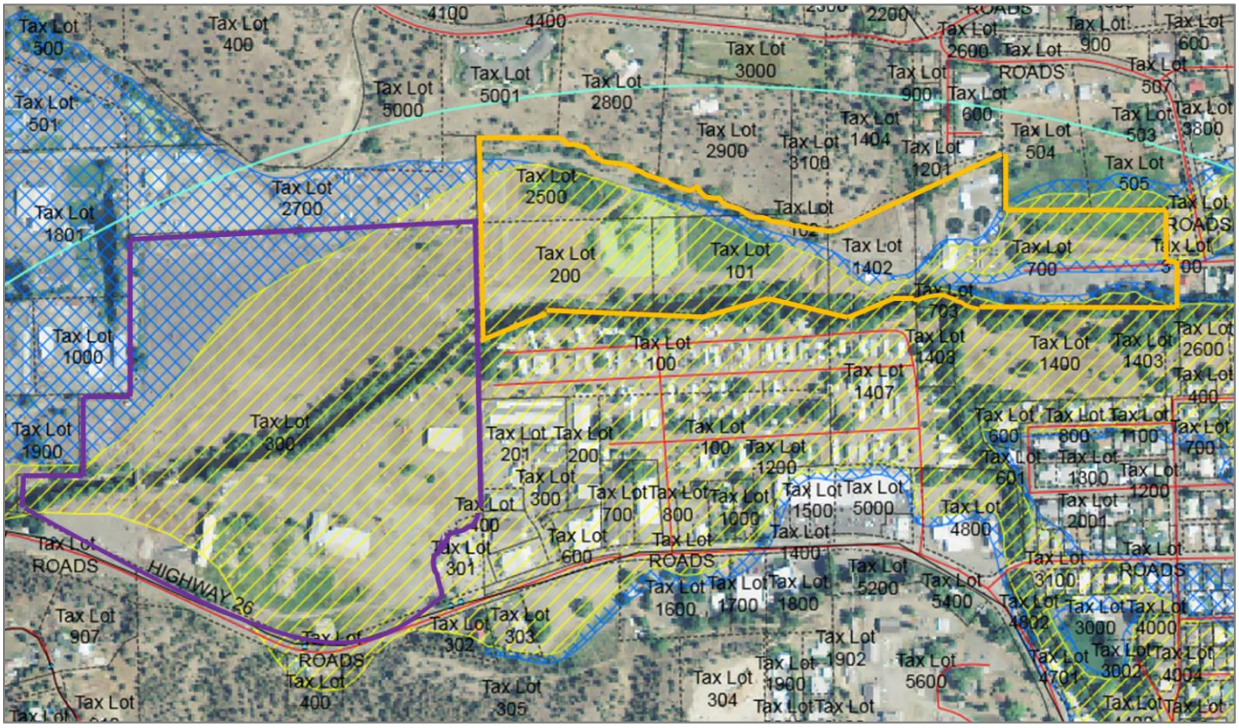
1 – Crops that are allowed for irrigation include examples under each wastewater classification and those for lower wastewater classes, e.g. crops that can be irrigated with class B wastewater include examples specific to class B above as well as non-disinfected, class D and class C.

2 – Not all setback requirements are included. For example class D wastewater applied with sprinklers must be 70 feet or more from areas of food preparation. This type of setback is not expected to apply to application on crops. Where an irrigation method is used to apply class C or lower recycled water directly to the soil, there must be a minimum of 10 feet from the edge of the site used for irrigation and the site property line, no setback requirements for class B or higher when applied directly to the soil.

Exhibit 2. Floodplain Map of City and Adjacent Property for new WWTF

City Property (Orange) and adjacent land (Purple); 100-year floodplain is in Yellow.





ATTACHMENT 2
Memorandum Regarding Option 2

anderson perry & associates, inc.

1901 N. Fir Street, P.O. Box 1107
La Grande, OR 97850
(541) 963-8309, Fax (541) 963-5456
www.andersonperry.com

engineering ▪ surveying ▪ natural resources

MEMO

To: Peggy Gray and Dave Holland, City of John Day

From: Brett Moore, P.E.

Subject: **Wastewater Treatment Facility Site Visit and Discussion Held January 15, 2015**

Date: January 26, 2015

File No. 592-23-02 (w/encl.)

cc: Andy Perry, AP

The following provides a summary of information discussed regarding the City of John Day's wastewater treatment facility.

PERMITTING

Water Pollution Control Facilities (WPCF) Permit

Discussions with the Oregon Department of Environmental Quality (DEQ) in November 2014 indicated that the DEQ intends to issue a new WPCF Permit for a 10-year period. Discussions also indicated that the DEQ is doing this with some reservation because new regulations treat indirect and direct discharge to the river as the same thing and also require a National Pollutant Discharge Elimination System (NPDES) Permit. If, for some reason, this decision is challenged by a third party, the DEQ has said they will revoke the WPCF Permit and be required to issue an NPDES Permit. NPDES Permit requirements will cause the City to need to make significant capital improvements to the existing facility.

NPDES Permit

An NPDES Permit is a federal permit that allows discharge of treated wastewater to a river. Given the John Day River's significance for anadromous salmonids, the requirements for discharge are significantly more scrutinized than the state-issued WPCF Permit. Initial requirements that wastewater treatment will need to address include temperature reduction, nutrients removal, chlorine residual control, and ammonia reduction. Anticipated future regulations also indicate that treatment for heavy metals including lead, copper, zinc, and arsenic may be required. Given the federal government's permit regulation history, it is not unreasonable to assume that regulations will continue to become more restrictive and continue to require the City to make additional improvements. Even current NPDES Permit requirements will cause the City to have to make significant capital improvements to the existing facility. It is safe to assume that the City will be required to comply with an NPDES Permit in the next 10 to 15 years.

EXISTING TREATMENT FACILITY

As the existing treatment facility continues to age, maintenance costs and challenges will most likely continue to rise and improvements will be required. Much of the existing piping has been functioning since the late 1970s, and some of the concrete structures are nearly 50 years old. Typical life expectancy for concrete is about 50 years. The City's public works department has done a commendable job making repairs and keeping up with the maintenance requirements to keep the existing facility functioning well. Despite these efforts, the facility is experiencing pipe failures, concrete decay on drying beds, concrete joint leaks on the clarifier, and operational challenges with the chlorine contact basin and digester lid. Failure to remove grit and trash early in the treatment process is also taking a significant toll on the treatment facility. Discussions with the City indicated that some improvements will need to be made in the near future to keep the existing facility operational. Given the age of the existing facility, it would not be practical to upgrade the existing facility to meet the likely requirements of a new NPDES Permit and, therefore, the City would need to construct a new treatment facility. New treatment facility options range from $6 to $8 million and could cost significantly more considering inflation and possible more restrictive permit requirements.

SHORT-TERM WORK ITEMS

Even though there is a possible 10- to 15-year timeline for being required to implement major improvements as a result of an NPDES Permit, some short-term improvements to the existing facility should be considered that would allow the facility to successfully operate for the next 15 years. These should be completed in such a way as to be utilized when the long-term improvements are completed. The approach to identifying improvements would be to first identify components that are failing, such as the primary effluent piping, digester lids, secondary clarifier concrete, etc., to keep the facility functional. The next step would be to identify improvements that could be used to extend the life of the existing facility and also complement possible long-term future improvements. A new trash removal system (headworks screen) and grit removal system could be added to reduce load on the existing facility and could be designed to plug into a new facility or complement a new irrigation system. It is estimated that possible short-term improvements could cost in the range of $250,000 to $350,000. This estimate should be further refined working with City staff on actual required improvements.

LONG-TERM WORK ITEMS

After identifying improvements needed to keep the existing facility operational, the City is in a position to develop a long-term approach to dealing with the treated wastewater. Possible disposal alternatives include a new mechanical facility or a new land application/irrigation system. If the new WPCF Permit goes uncontested, timing for major improvements could possibly be arranged to correspond to debt retirement of the airport project, thereby helping to reduce impacts to rate payers.

Develop Disposal Alternatives

New Mechanical Facility

The existing Facilities Plan outlines a number of alternatives and provides, in detail, the costs associated with a new mechanical treatment facility that would allow the City to continue to

discharge water to the John Day River and meet the requirements of an NPDES Permit. There are a number of decisions the City can make regarding the components and operations of the new facility. Making these decisions will enable costs to be refined.

New Land Application/Irrigation System

One alternative that could be further developed is a land application/irrigation system treatment and disposal option. This alternative is attractive because it allows the City to avoid the more restrictive federal NPDES Permit and stay with the state's WPCF Permit. It is also attractive because it can be simpler to operate and requires fewer certifications for operators. The challenges involve finding the land and committing to long-term pumping costs. Initial calculations indicate that a storage area of 35 to 50 acres and an irrigation area of 120 acres are needed. Additionally, a pipeline and pump station(s) would need to be constructed to move the water from the existing facility to the new storage ponds. See the attached Figure A. Initial calculations predict the cost of this option to be in the range of $6 million. This option may require a little more upfront work with land purchases, lease agreements, and easements, but could provide a long-term solution that is simpler to operate and less regulated.

POSSIBLE WORK PLAN

The following outlines a possible work plan for developing a long-term solution for the City's wastewater treatment system.

2015 Work Items

- Secure a 10-year WPCF Permit from the DEQ.
- Identify needed improvements and develop cost estimates for extending the life of the existing facility.
- Seek possible funding (capital funds/loan/grant) options for improvements at the existing facility.
- Complete designs for existing facility improvements for bidding in 2016.
- Explore and refine desired options for a possible new mechanical system to address an anticipated NPDES Permit.
- Refine cost estimates for a new mechanical system.
- Explore the viability of a land application alternative.
- Develop and refine cost estimates for a land application alternative if it is found to be viable.

2016 Work Items

- Make decision for long-term approach: either new mechanical system or land application system.
- If land application is viable and selected, begin landowner discussions and secure agreements.
- Bid and construct Improvements for the existing facility.
- Develop a funding plan for the selected long-term improvements alternative.

2017-2020 Work Items

- Implement the funding plan.
- Develop a public outreach plan.
- Implement the public outreach plan.
- Seek funds for the possible design effort.

2021-2025 Work Items

- Complete design effort for selected alternative.
- Secure funding.
- Obtain permits.
- Bid project and secure contractor.
- Construct new system.

2025 Work Items

- New system goes on line.

BM/cd
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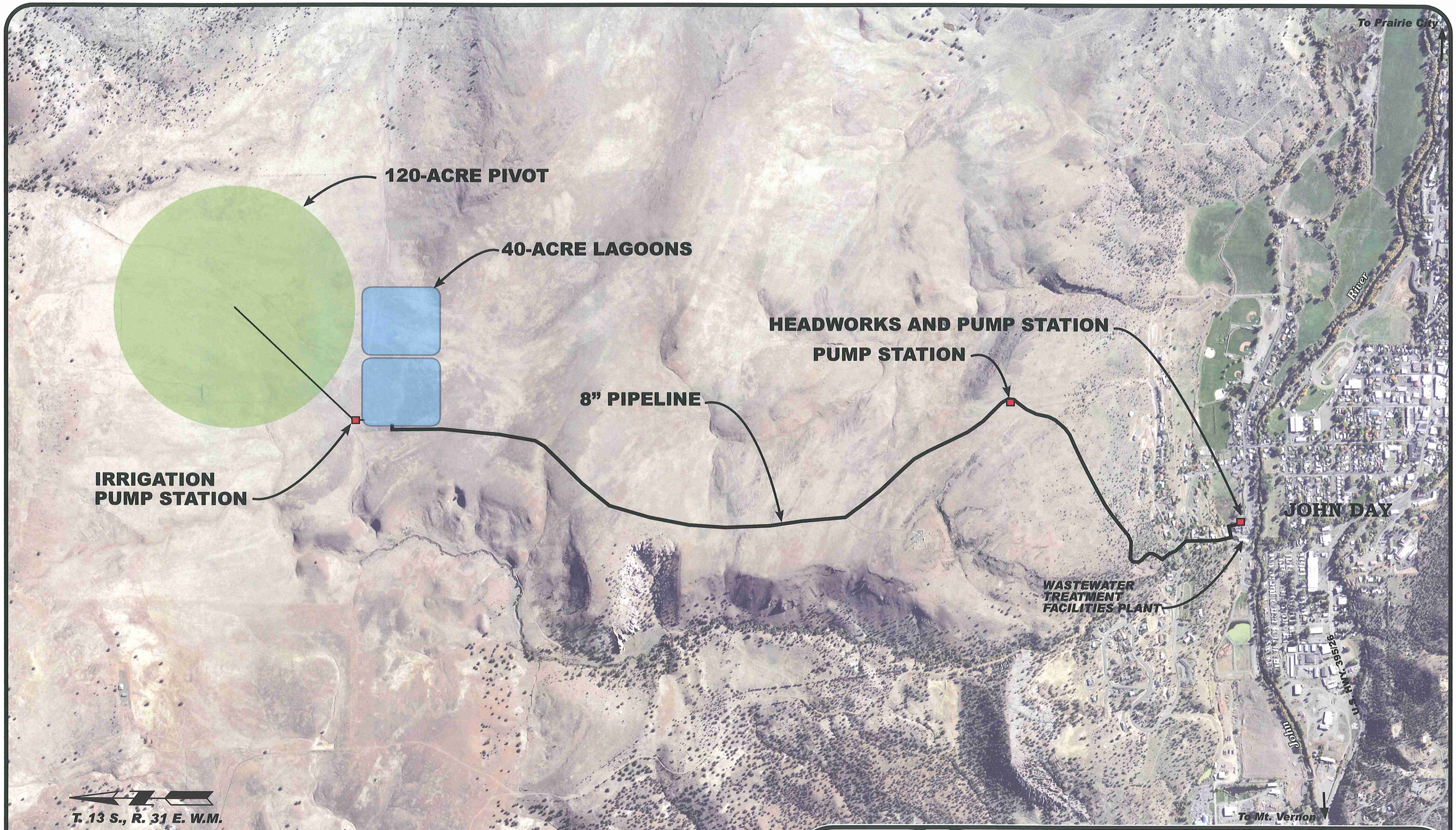

anderson perry & associates, inc.

CITY OF
JOHN DAY, OREGON
WASTEWATER SYSTEM IMPROVEMENTS

WASTEWATER IRRIGATION OPTION

FIGURE
A

Job# 592-BD Jan 23, 2015 lbauer

ATTACHMENT 3
Feasibility Study Team

Our team is composed of leading industry experts and nationally recognized non-profit organizations. Each member of the team brings unique expertise and decades of credible past performance, making this an ideal team to determine whether a wastewater reuse option is economically viable for the John Day area.

City of John Day

The team is led by Nicholas Green, John Day City Manager. Mr. Green holds a Master in Public Administration from the University of Washington (UW) Evans School of Public Policy and Governance, a Certificate in Technology Entrepreneurship from the UW Foster School of Business, and a Bachelor of Science in Microbiology from Brigham Young University. He has twelve years of professional experience as a technology advisor in global engineering and management consulting firms Jacobs Engineering and Booz Allen Hamilton. Mr. Green has a strong commitment and dedication to public policy and bringing innovative and sustainable development projects to the City of John Day.

Anderson Perry & Associates, Inc.

Anderson Perry (AP) is a full-service civil engineering, surveying, and natural resources firm. Established over 40 years ago, AP is one of the Northwest's most diverse civil engineering firms east of the Cascade Mountains. AP has partnered with the City of John Day almost since the firm's inception. AP designed the City's water and wastewater systems and has expert knowledge of their components. AP also completed the City's 2010 Wastewater Facilities Plan and has conducted multiple site surveys within the John Day River Basin in anticipation of the future facility design. AP was awarded the 2015 Project of the Year (for projects under $10 million) by the American Society of Civil Engineers (ASCE) Columbia Section for their work on the Port of Walla Walla's Burbank Business Park Wastewater System Improvements project.

Sustainable Water

Sustainable Water is a leading provider of commercial-scale water reclamation and reuse solutions across the United States. Their ecologically driven solutions bring together teams of experts who have built hundreds of high-profile, innovative, multi-million-dollar projects. Sustainable Water's staff has over 75 years of combined experience in biological and process water treatment, water-based heat transfer, and central utility plant operations. Their diverse team of engineers, planners, and technology specialists has first-hand knowledge of impactful water and energy management strategies. Sustainable Water is changing the paradigm for water and wastewater management – expanding sustainable and impactful water conservation and reuse solutions to new markets like the John Day River Basin.

Trout Unlimited

Trout Unlimited (TU) is an American non-profit organization dedicated to the conservation of freshwater streams, rivers, and associated upland habitats for trout, salmon, other aquatic species, and people. July 2009 marked the 50th anniversary of TU's founding on the banks of the Au Sable River near Grayling, Michigan. Today, TU is a national organization with more than 150,000 volunteers organized into about 400 chapters from Maine to Alaska. From its hundreds of local stream restoration projects, to helping lead the way to remove the Edwards Dam on the Kennebec River in Maine, to compelling Congress to strengthen the Clean Water Act, TU has a strong 50-year track record of conservation achievements. As a partner with the City of John Day, TU will provide technical and advisory assistance on restoration efforts, policy options, and optimal outcomes for the proposed wastewater reuse features.

University of Washington

The City of John Day is looking to engage a student consultant team from the University of Washington composed of two to four skilled graduate students who provide approximately 10 to 12 hours of work each per week (totaling 200 to 250 hours of work per consultant). Student teams will be overseen by Professor Greg Traxler, who joined the Evans School faculty in winter 2015. Prior to that he was a Senior Program Officer at the Bill & Melinda Gates Foundation (2008-2014) and a Professor in the Department of Agricultural Economics at Auburn University (1990-2008). He was also an Affiliate Scientist in the Economics Program at the International Maize and Wheat Improvement Center (1996-2003). Traxler's research focuses on the economics of agricultural science and technology in the United States and internationally, with specialties in Agricultural Economics, Science and Technology Policy, and Technology and Public Policy. He holds a Ph.D. in Agricultural Economics from Iowa State University, an M.S. in Agricultural Economics from the University of Minnesota, and a B.B.A. in Economics from the University of Portland.

Oregon State University

The Oregon State University College of Agricultural Sciences is Oregon's principal source of knowledge relating to agricultural and food systems, and a leader in the study of natural resources, life sciences, environmental quality, and rural economies. As a fundamental part of the university's land-grant mission, the college works to enhance knowledge, solve problems, and discover new opportunities for the future. Oregon State was ranked among the top ten in the world in agriculture and forestry in 2015 by QS World University Rankings, and its impacts are felt throughout the state, the nation, and the world. If it receives funding for this feasibility study, the City of John Day intends to engage OSU as a cooperative research partner with the long-term goal of establishing the first Oregon Agriculture Experiment Station in Grant County should the commercial hydroponics option prove feasible.

ATTACHMENT 4
IFA Pending Funds Documentation

Dana Kurtz

From: BEAN Tawni * BIZ <Tawni.Bean@oregon.gov>
Sent: Wednesday, September 14, 2016 11:43 AM
To: Nicholas Green
Cc: Andy Perry; Brett Moore
Subject: RE: John Day Wastewater Facilities Plan Update
Attachments: Intake.doc

Nick,

Thank you so very much for following up on that stuff. We definitely start the process of obtaining a Water/Wastewater Technical Assistance grant. As I had mentioned before it is the grant if for $20,000 we do offer loan funding to through that program which would be a 7 year loan at 1.42%, if the cost of the update is above and beyond the $20,000.

I am attaching an intake form which is the first step of the process, once you have completed the form please return it to me and I will route it internally.

Let me know if you have any questions or need anything additional from me at this time.

Thank you so very much!!

Tawni Bean
Regional Coordinator, Infrastructure Division
Oregon Business Development Department
775 Summer St NE, Suite 200
Salem, OR 97301-1280
Cell: 503-551-0957
Fax: 503-581-5115

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From: Nicholas Green [mailto:greenn@grantcounty-or.gov]
Sent: Tuesday, September 13, 2016 8:46 AM
To: BEAN Tawni * BIZ
Cc: Andy Perry; Brett Moore
Subject: John Day Wastewater Facilities Plan Update

Tawni –

I met with Anderson Perry about two weeks ago. They talked me through the pro-bono work they did for the City as a follow-up to our 2009 Wastewater Facilities Plan. My understanding is that the City at the time felt like there wasn't enough attention given to the land application option when the 2009 Plan was written, and Anderson Perry offered to come out and do a site visit at no cost to the city.

The attached memo is the work product that resulted from the site visit. It was a good jumping off point, but none of this information ever made it into a revised Plan. It was also based on the assumption that DEQ was going to reissue a permit to the City for another 10 years, but DEQ never issued it and my understanding is that they didn't want the potential liability given the condition of the current plant.

After talking it over with DEQ and Anderson Perry, I think our best approach is to formally update the 2009 Plan. I would like it to focus on four items:

1) Add hydroponics as a treatment option, since that technology had not been implemented when the original study was done and we have a potential partner in Sustainable Water that could enable us to privatize the system and/or develop a commercial use for the reclaimed water
2) Formally incorporate the land application / irrigation system treatment and disposal option based on the 2015 site visit with updated information on changes since that time
3) Update the costs for the options presented in 2009 plus 1&2 above to reflect 2017/18/19 dollars as opposed to 2010
4) Relook our population projections and tax base / ability to pay in light of the steady population decline we've experienced over the last two decades. I'd specifically like to do our own local income survey to see if we can qualify for community development block grants and factor that outcome into our analysis.

Let me know your thoughts on how best to proceed. If we can get a TA grant for the plan update, I think the City can put together the funding for the income survey. I understand that Prairie City is looking to do an income survey as well. If we can get PSU to do ours at the same time that would be great, but I don't know how much lead time they need.

Thanks,

Nick

Nicholas Green, City Manager
City of John Day
450 East Main Street
John Day, OR 97845
PH: 541-575-0028
Fax: 541-575-3668
Email: greenn@grantcounty-or.gov
Website: www.cityofjohnday.com

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