

CITY OF JOHN DAY

mayor
Ron Lundbom

city manager
Nicholas Green

secretary
Chantal DesJardin

council
Shannon Adair
Gregg Haberly
Dave Holland
Steve Schuette
Elliot Sky
Paul Smith

January 7, 2021

Re: John Day Wastewater System Improvements – Progress Update

PURPOSE

The purpose of this memo is to provide an interim progress report to the city council on the work accomplished over the past two years with regard to designing, financing and permitting the City's wastewater system improvements project (the "Project").

BACKGROUND

City and DEQ staff and consultants held a teleconference on September 4, 2018 and a follow up technical meeting on September 17, 2018 (**Enclosure 1**). Following that meeting, in an email dated October 23, 2018, DEQ requested that the City of John Day submit a technical memo outlining our proposed sites and approach for a recharge/re-use permit (**Enclosure 2**). Following these discussions, Anderson Perry (City's initial consultant) developed several updates to the City's 2010 Wastewater Facilities Plan (the "2019 Plan Update"). The 2019 Plan Update was conditionally approved by DEQ on March 12, 2019 (**Enclosure 3**) and adopted by Resolution 19-804-05 of the city council the same day (**Enclosure 4**).

Conditions of Approval for the 2019 Plan Update were as follows:

- The facilities plan will be updated through an addendum or other means once there is more clarity on the permitting path forward which will be determined through a collaborative effort between the City, the City's consultants and DEQ permitting staff;
- Minor revisions will be made to the facilities plan to better support the data and assumptions made in the assessment; and
- One hard copy and one PDF version of the final plan are provided to DEQ upon finalization.

COMPREHENSIVE PLANNING

The City has achieved several significant milestones for the Project. The body of work is available online and has been adopted as part of the City's comprehensive plan and statewide planning goal updates. It includes:

- [Wastewater Facilities Plan Update \(2019\)](#)
- [John Day Housing and Community Development Analysis \(2019\)](#) (Goal 10 update)
- [Economic Opportunities Assessment \(2019\)](#) (Goal 9 update)
- [John Day Comprehensive Economic Development Strategy \(2019\)](#) (Goal 9 update)

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- [Innovation Gateway Area Plan \(2019\)](#) and [Technical Appendix](#) (Goal 12 update)
- [Innovation Gateway Transportation Impact Analysis \(2020\)](#)
- [Natural Hazard Mitigation Plan \(2020\)](#) (Goal 7 update)
- [Wastewater System Improvements Draft Preliminary Engineering Report \(2020\)](#)
- [Wetland Delineation Report for Wastewater System Improvements \(2020\)](#)
- [Former Iron Triangle Industrial Site - Phase 2 Environmental Site Assessment \(2020\)](#)
- [Wetland Delineation Report for Iron Triangle Industrial Site \(2020\)](#)
- [Former Oregon Pine Mill Site – Environmental Site Characterization \(2020\)](#)
- [Wetland Delineation Report for Oregon Pine Mill Site \(2020\)](#)

These documents pertain directly to the Project, the Project site, and the surrounding lands that were purchase by the City for the Project and the John Day Innovation Gateway, which encompasses the Project and reuse sites for the reclaimed water from the Project (Figure 1).

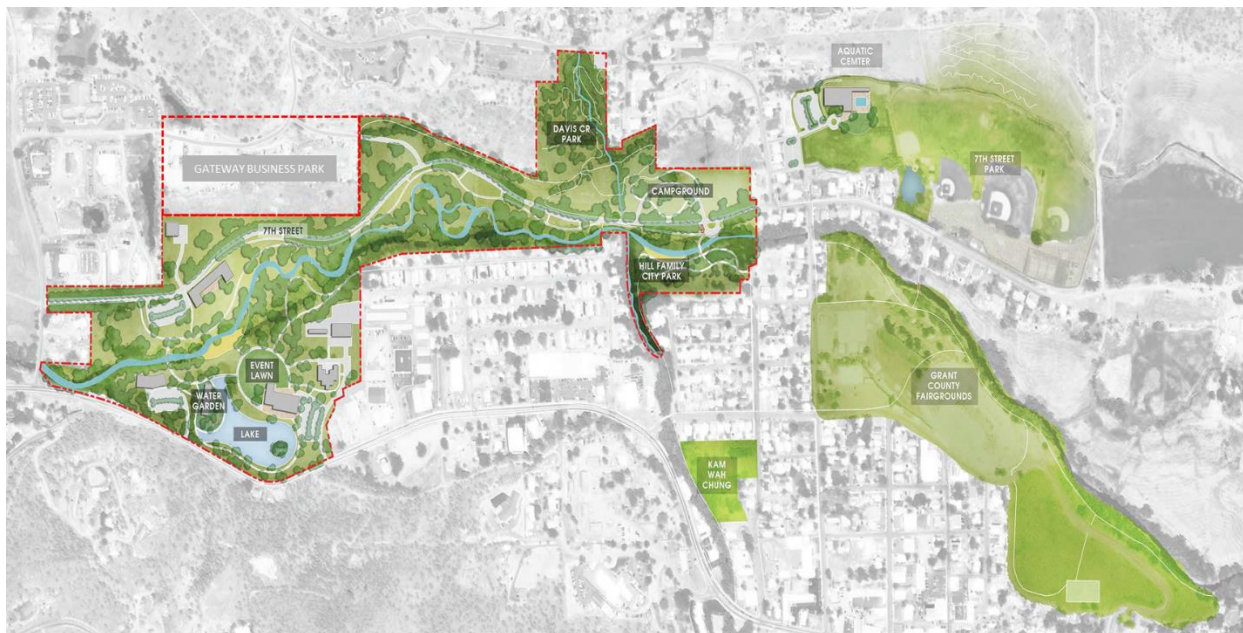


Figure 1. John Day Innovation Gateway and Integrated Park System

PROJECT DESCRIPTION

The Project was developed as Alternative B of the 2019 Plan Update. Generally, the project includes two elements: (1) the construction of a new Class A wastewater treatment facility with extensions of the collection system to the new Wastewater Treatment Facility (WWTF), treated effluent discharge piping, and Underground Injection Control (UIC) trenches; and (2) the demolition of the existing wastewater treatment facility on 7th Avenue. Disposal of treated effluent during Phase 1 of this project will involve a new UIC trench system east of the new WWTF. Phase 2, which is not a part of this project or the Environmental Assessment, will

include the construction of a purple pipe wastewater reuse line with other discharge alternatives. See the enclosed Project Map exhibits for illustration of the project.

Details of each project element are summarized below:

1. Design and construction of a new Wastewater Treatment Facility (WWTF)

The treatment facility system will be designed to produce up to Class A Recycled Water for beneficial reuse as irrigation, industrial process water, and hydroponic crop production, as described in Chapter 4 of the 2019 Plan Update. The new WWTF will include a visitor's center that houses a tertiary treatment process consisting of hydroponic reactors and displays for public education on the wastewater treatment process. The hydroponic reactors are aerated wastewater tanks with suspended plant racks that receive secondary treated wastewater from the package treatment plant.

The new WWTF will be located approximately 0.5 miles west of the existing WWTF and approximately 0.2 miles west of the existing percolation ponds. Project components will include installation of a gravity sewer line to the new WWTF location connected to the existing system, treated effluent piping, primary treatment system (headworks), a pre-fabricated secondary treatment system, solids digestion infrastructure, and wastewater conveyance infrastructure.

Piping for influent into the WWTF and for discharge of treated effluent will include:

- An 18-inch gravity sewer line to be constructed between the existing WWTF and the new WWTF to convey wastewater to the new facility. The 18-inch line will cross Davis Creek, which is conveyed by culvert under the road.
- A pressurized forcemain directly to the east of the facility that will feed a series of shallow trenches. Treated effluent discharge will percolate into trenches constructed to the east of the WWTF and dissipate above the seasonal water table. This will operate as the primary discharge point for the City's wastewater from the new WWTF.

The maximum ground disturbance depths for construction of the new WWTF will be approximately 15 feet for the headworks and installation of the 18-inch gravity sewer line; typical excavation is anticipated to be 5 feet.

The new WWTF will generally include: Headworks, including influent coarse and fine screening, metering, and lift station; Package membrane bioreactor mechanical treatment facility to produce up to Class A effluent; Visitor's Center including hydroponic reactors and educational kiosks; Operator's building and testing laboratory; Sludge processing building including sludge processing equipment; Two aerobic digesters; Recycled water control facility and effluent lift station; Yard piping, electrical and controls, surface restoration, etc. The UIC trench dimensions will be determined during the permitting process.

A gravel road and parking lot will be placed on the south side of the new WWTF to provide access to the new facility from the 7th Street extension, which the City will install before

CITY OF **JOHN DAY**

construction of the new WWTF as a part of the City's overall transportation system development. Stormwater from the new WWTF facility will be accommodated by on-site infiltration and the City's stormwater facilities. An extension to 7th St to the south of the new WWTF will include a ditch on the north side of the street that will convey any stormwater from the facility to the Patterson Bridge intake of the City's stormwater system. Additionally, site conditions are porous and rocky, which will create excellent on-site conditions for infiltration of stormwater. There will be no run-off into the John Day River from the new impervious surface. John Day is also a very dry area and receives an average of <14 inches of precipitation annually.

2. Demolition of the old Wastewater Treatment Facility

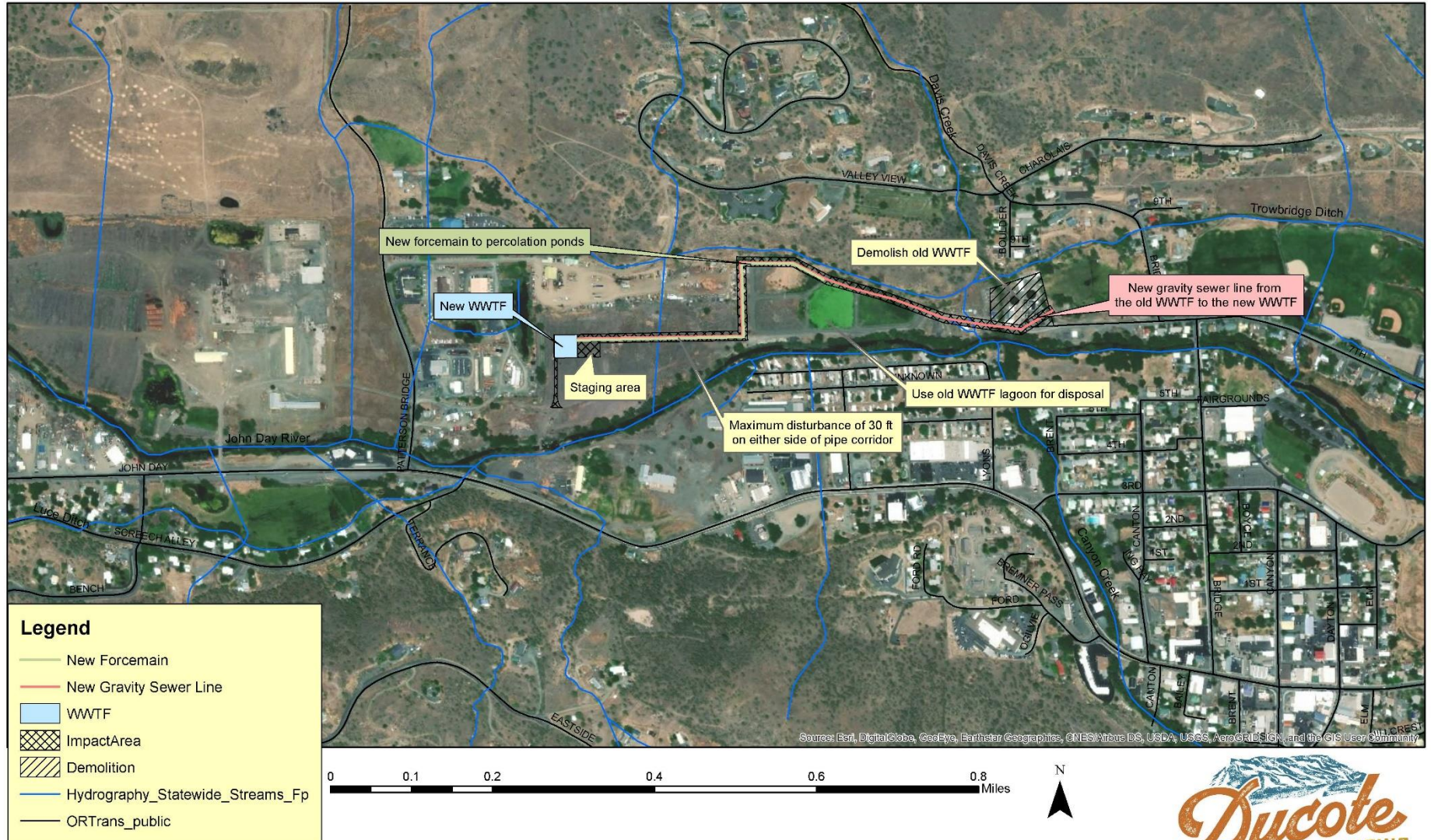
The existing WWTF and percolation ponds are for disposal of Class B effluent are located on the northwestern end of John Day at the end of 7th Avenue and will be demolished as a part of this project once the new WWTF is constructed and fully operational (Figure 2).



Figure 2. Current Wastewater Treatment Plant

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City of John Day Wastewater System Improvements: Phase 1 Project Map, General Overview



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FACILITY DESIGN & ASSESSMENT

The 2019 Plan Update built on the City's 2010 Wastewater Facilities Plan. It identified the major components of the proposed treatment plant in need of repair and replacement, which was used as the basis of design for creating the draft 2019 Preliminary Engineering Report (PER) produced by Anderson Perry for the facility.

The City contracted with a team from Flagline Engineering/Kennedy Jenks in October 2020 to complete the PER. The team performed a field survey October 29th and conducted an assessment of the current treatment plant. The week of November 10th the survey team did the LIDAR aerial survey of the project site. That data is currently being processed. Work has begun on the treatment plant alternatives and staff are providing data on flow rates for the future hotel and other developments proposed within the Innovation Gateway and adjacent to the Project.

Kennedy Jenk's field memo of their site assessment for the current treatment plant determined that the base case of repairing the current plant *in situ* is not technically feasible (**Enclosure 5**). The combination of the current facility being located in the floodplain, its age and condition, and violations of NFPA 820 classification criteria would require a complete rebuild of the plant in a floodplain location while working around the existing plant to keep it operational during the upgrades. Because we can't elevate the components to one foot above base flood elevation, this alternative would also require some form of flood hazard mitigation like diking along the riverbank.

For these reasons, the engineers and City recommend replacement of the plant at the new location purchased for that purpose. USDA's engineer concurred with this assessment on January 06, 2021.

FINANCING

Business Oregon funds along with City match are being used to completed the PER and the final design/procurement of the package treatment plant. USDA funds will be used for construction and on-site assembly of the package treatment plant.

The City was awarded two brownfield redevelopment fund grants in FY20 to complete the environmental assessment of the Oregon Pine site and the Iron Triangle site, directly south and north of the Project (respectively). These funds were used to complete the wetland delineations and remaining environmental characterization for the adjacent sites where reclaimed water will be repurposed. The Oregon Pine site had no significant findings. The Iron Triangle site had residual fuel-oil deposits that will require excavation and removal from one location where an above-ground storage tank (AST) was historically located. Business Oregon awarded a \$595,000 brownfield redevelopment loan for the purchase of the Iron Triangle property and to complete the residual site remediation at that location.

Business Oregon also issued a loan/grant combination in FY21 for \$2.25 million to complete final design and begin construction of the pre-fabricated treatment plant, which consists of a

CITY OF JOHN DAY

grant of \$750,000 and a loan of \$1.5 million for 30 years at one percent interest. The sewer rates will increase by \$12 in January 2021 to offset the cost of the Business Oregon loan and create more liquidity in this fund as we move into construction. The balance of the financing for the project will be provided by the CDBG program (\$2.3 million grant) and USDA Rural Development under a combination grant/loan guarantee.

ENVIRONMENTAL ASSESSMENT & SITE CHARACTERIZATION

The City followed USDA's 8-stage notification process and has received environmental concurrence on these Project components from the relevant stakeholders. The Department of State Lands (DSL) has reviewed and concurred with the wetland delineation report submitted for the project site (WD # 2020-0186) and the wetland delineation report submitted for the remainder of the Oregon Pine property (WD # 2020-0388), which is not proposed for development using Project funds but will be developed as companion projects adjacent to the site. The City submitted a third wetland delineation report for the former Iron Triangle property that was purchased in June 2020 due north of the Project site (WD # 2020-0439), which is pending review and approval by DSL.

The City has also completed three different groundwater monitoring assessments/reports for the site at the request of DEQ:

- George Chadwick Consulting, 1999. *Hydrogeological Characterization for the John Day Wastewater Percolation Ponds*, John Day, Oregon. March.
- George Chadwick Consulting, 2019. *2018 Annual Groundwater Monitoring Report for the John Day Wastewater Percolation Ponds*. February.
- George Chadwick Consulting, 2020. *Proposed Sites and Approach for Groundwater Recharge of Treated Effluent for the City of John Day, Oregon*. February.

This last memo was produced in response to DEQ's request for the City to submit a technical memo outlining our proposed sites and approach for a recharge/re-use permit.

In February 2020, hydrogeologist George Chadwick, PE, PhD, performed an analysis and feasibility of groundwater recharge for treated effluent at the project site. As the Chadwick report explains, "the document is to draw conclusions regarding the interaction of groundwater and surface water in the vicinity of the WRF [water reclamation facility]." Chadwick Consulting has previously studied the John Day area and has done extensive analysis and characterization of the areas. One of the primary issues meant to be analyzed by the Chadwick report is the connectivity of the groundwater in this area to the John Day River.

In October 2018, Oregon DEQ communicated to the City that one of the primary factors in determining the suitability of UIC under a WPCF (and not NPDES) permit would be whether "there is sufficient distance between the bottom of the UIC/infiltration basin and the seasonal high groundwater." [1] The Chadwick report demonstrates how the City's proposed solution complies with this vertical separation requirement:

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In the vicinity of the proposed trenches the water table during 2019 was approximately 8 to 10 feet below the ground surface... At that depth, a recharge trench could be constructed below the frost level, but still be well above the natural water table. For example, trenches constructed to a depth of 4.5 feet would still be about 3.5 to 5.5 feet above the high water level measured in April 2019. (Chadwick 2020, page 4)

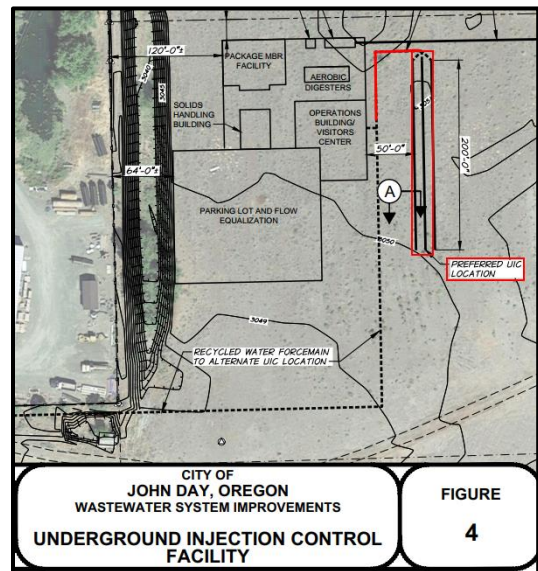
PERMITTING PATHWAY

Based on prior conversations, including those provided in the enclosures, the City and its engineers have determined that a WPCF permit with UIC for excess effluent is our preferred option. The WPCF permit allows the City to continue to develop its water reuse plans with the following intended uses:

- Greenhouse crop production for human consumption;
- Log deck watering / torrefaction / boiler operations at Malheur Lumber;
- Land application at the Innovation Gateway and Integrated Park System.

The WPCF permit also allows the City to discharge treated effluent through the subsurface when water reuse opportunities are not an option (e.g., outside of irrigation season).

The proposed location for the UIC is shown in the figure (above) and is due east of the new WWTF.



NEXT STEPS

The City is requesting that DEQ provides specific guidance regarding what additional data and other site information is needed to submit a complete WPCF permit application. Once this information is received, the engineers will be able to complete the PER and we will submit the environmental paperwork and engineering documents for review and approval by USDA, DEQ and our Business Oregon lenders. Upon receipt of their approval, we will solicit for the procurement of the package plant and submit the final application for USDA funding to begin construction.

The CDBG funding application and public hearings will also be completed this spring for the remainder of the CDBG funds (\$2.3 million). Concurrent with the PER and environmental, we will be evaluating options for re-routing portions of our sewer collection system to reduce lifecycle costs by eliminating pump stations and improving our collection system arterials leading into the new wastewater treatment plant.

Conference Call Summary

September 17, 2018 Policy and Technical Conference Call to Discuss Recycled Water Option

Participants: Brett Moore, Mike Lees, Linda Hayes-Gorman, Nancy Breuner, Ron Doughten, Pat Heins, Don Butcher, Phil Richerson, Matt Kohlbecker, Todd Hesse

Reason for the call:

- Currently the John Day WWTP discharges to the river indirectly, and we don't have much of a track record of permitting indirect discharges to the river, and I (Don) would venture that all the bottom land of the valley is highly transmissive and the shallow water goes to the river, requiring an NPDES permit
- The river has new 303(d) listings since the TMDL was developed and an older spawning DO listing, all with no TMDLs, and it could take years to develop TMDLs.
- Apparently, there is not sufficient available land area for winter storage and perhaps growing season land application as well, though there are other out of stream uses.
- If some of the effluent will be going to the river, the federal prohibition on new discharges (40CFR122 (h) (I)) would not allow a new NPDES discharge without full implementation of TMDLs where water quality standards are not being met. And this is considered a new discharge to the river because it has never been permitted via NPDES.

Don: All this amounts to challenges in terms of permitting approaches. Therefore, the topic of today's conversation is to describe a type of WPCF permit that would go to groundwater, in terms of applicability of permit and any constraints and opportunities. In short, what can and cannot be done under this permit. DEQ will continue to review the possibility of river discharge as well (NPDES), as the next 6 months of 303(d) list changes unfolds.

Ron: One avenue would be a WPCF following the recycled water rules (OAR Division 55). It is our understanding that the water would be treated to class A (Brett agreed) and if the treated wastewater could be discharged to a trench or UIC and had no adverse influence on groundwater and did not connect to the river this approach may be appropriate. We should all be clear that this type of permit is re-use, not disposal.

Pat: Vertical separation between introduction and the water table is called for in the permit, but not quantitatively (Matt – the separation is rule-defined based on static water table, so hydraulic connectivity via continuous discharge is not necessarily an obstacle).

Brett: The amount of wastewater going underground seasonally would approach a high of 300,000 gallons per day. Injecting some aquifers would not work because of limited volumetric capacity in the aquifer. The shallow water table is 6-10 feet deep. Available confined aquifers are within 600 feet below the ground surface. Discharge sites could be as much as 1000 feet from the river. An optimal site is an old mill 600 feet from the river. Any discharge in the valley bottom would probably form a layer on top of the aquifer and transport to the river via laminar flow.

Group: There may or may not be a need for a monitoring well network. There was also discussion of discharge on the airport bench. Setbacks, thin soils could be problematic, but injection here would be further from the river, and could be deep enough to get below the river to avoid influence.

Phil: Should confirm that discharge area (old mill site) would not mobilize legacy contaminants to the water table. Brett – this has been tentatively evaluated through Phase 1 and 2 investigations, but this may not definitively address that question.

Next steps: Pat Heins will summarize the conditions of the recharge re-cycle water permit. Anderson Perry suggested putting out a technical memo outline an approach for DEQ to review. DEQ will work closely with Anderson Perry and the City to identify a viable approach.

DEQ Points of contact: Pat Heins (re-use), Don Butcher or Todd Hess (if NPDES or de-listing), coordination between the city, Anderson Perry and DEQ upper management (Linda Hayes-Gorman and Nancy Breuner).

From: [BUTCHER Don](#)
To: [BUTCHER Don](#)
Subject: FW: City of John Day permit options
Date: Tuesday, October 23, 2018 5:03:45 PM

From: HEINS Pat
Sent: Tuesday, October 23, 2018 12:25 PM
To: BREUNER Nancy <Breuner.Nancy@deq.state.or.us>; BUTCHER Don <BUTCHER.Don@deq.state.or.us>
Cc: HAYES-GORMAN Linda <Linda.HAYES-GORMAN@state.or.us>; DOUGHTEN Ron <DOUGHTEN.Ron@deq.state.or.us>; RICHERSON Phil <Richerson.Phil@deq.state.or.us>
Subject: City of John Day permit options

Based on my phone conversation with Don, I believe a WPCF permit with recycled water and artificial aquafer recharge could be an option if an appropriate application site is identified. This may be possible at the old mill site if there is sufficient distance between the bottom of the UIC/infiltration basin and the seasonal high groundwater. As indicated previously, vertical separation between the discharge point and the water table is required, but not quantified. This separation is based on the static water table, so hydraulic connectivity via continuous discharge is not necessarily an obstacle for aquafer recharge. However, the proposed site does need to be sufficiently far enough away such that there is no detectable nexus with surface water bodies (John Day River or contributing streams). The vertical separation can be artificially increased by importing additional fill or pumping the effluent up slope away from the John Day River. Pumping up slope could potentially increase the depth of vadose zone sufficient to provide adequate treatment/mixing provided the local geology does not force the discharge to daylight along the side slope. Any site that is selected for the aquafer recharge or rapid infiltration must be reviewed to ensure existing contamination is not mobilized with the increased flow.

Direct injection into a confined aquafer is not an option in this case. Direct injection is not permissible with recycled water.

Once the city starts creating class A recycled water there is potential for an increase demand from surrounding agricultural land or city owned property to use recycled water in lieu of instream or groundwater rights during the summer months which can reduce the volume injected to winter months only.

In order to best support the City in determining a viable discharge option in addition to those proposed (green houses, etc.) that do not fully address the volume needed, particularly in the winter; DEQ requests that the City of John Day submit a technical memo outlining their proposed sites and approach. This memo should include the following for any proposed sites: identify groundwater flow direction and indicate any down gradient wells, provide the depth to groundwater at the proposed sites with a discussion of seasonal groundwater fluctuation, indicate the distance to any surface water body, as well as a description of the general soil and geologic profile of the proposed sites.

Pat Heins

Oregon DEQ
State Biosolids & Water Reuse Coordinator
700 NE Multnomah St., Suite #600
Portland, OR 97232
503-229-5749



Oregon

Kate Brown, Governor

Department of Environmental Quality

Eastern Region Bend Office
475 NE Bellevue Drive, Suite 110
Bend, OR 97701-7415
(541) 388-6146
Fax (541) 388-8283
TTY 711

March 12, 2019

Nicholas Green, City Manager
City of John Day
450 East Main Street
John Day, OR 97845

RECEIVED
MAR 18 2019
CITY OF JOHN DAY

Re: WQ – Grant County
City of John Day
WPCF 102481, File No. 43569
Wastewater Facilities Plan Update

Mr. Green,

On August 27, 2018, the Department of Environmental Quality received the John Day Wastewater Facilities Plan Update (Study) submitted by Mike Lees, Engineering Technician, with Anderson Perry & Associates, Inc. Final revisions were received on 03/11/2019 from Mr. Lees.

Background

The City of John Day (City) operates a wastewater treatment facility, which includes an influent lift station, headworks, two primary clarifiers, two trickling filters, one secondary clarifier, chlorine disinfection, two-stage high rate anaerobic sludge digester, four sludge drying beds and four infiltration ponds adjacent to the John Day River. The treated effluent is discharged to four infiltration ponds for disposal.

Study Description

The focus of the Study is on the wastewater treatment system. A thorough collection system elevation was completed in the 2010 Facility Plan. The work on the collection system has significantly reduced maximum monthly flows. Assessment of infiltration and inflow rates in the Study indicated that I/I is not excessive for the community of John Day. While the Study recommends an infiltration and inflow evaluation, this was not included.

The selected alternative is the construction of a new wastewater treatment facility due in part to the age and deteriorated condition of the existing wastewater treatment facility. The selected alternative includes:

- headworks with fine screening and grit removal;
- influent lift station;
- membrane bioreactor package facility that contains all the components necessary for wastewater processing, including tanks, pumps, valves, blowers, mixers, flowmeters, and the membranes;
- aerobic digestion and composting of biosolids;



- beneficial reuse through irrigation of Class A effluent at the City parks, greenways, ball fields, and the golf course; greenhouse heating and cooling, hydroponic crop demands, torrefaction process water, and potential log deck watering at Malheur Lumber;

Beneficial reuse as described above is unlikely to use all the treated effluent produced by the City's wastewater treatment facility. The City and their consultants are currently working with DEQ to explore potential permitting pathways for discharge of any effluent above what can be beneficially reused as described above including aquifer storage and recovery or underground injection control. Of those two alternatives, underground injection control appears to be more feasible than aquifer storage and recovery for reasons described in the Study.

Conditions of Approval

The Study is hereby approved provided the following conditions are met:

- The Study will be updated through an addendum or other means once there is more clarity on the permitting path forward which will be determined through a collaborative effort between the City, the City's consultants and DEQ permitting staff;
- Minor revisions will be made to the document to better support the data and assumptions made in the assessment as discussed with Mike Lees; and
- One hard copy and one PDF version of the Final Plan are provided to DEQ upon finalization of the Study.

Please call me in Bend at (541) 633-2026 if you have any questions.

Sincerely,



Todd Hesse, PE
Sr. Plan Review Engineer
Eastern Region - Bend Office

cc: Water Quality Permit File, DEQ Pendleton Office
ec: Mike Lees, Anderson Perry & Associates, Inc.
Brett Moore, Anderson Perry & Associates, Inc.
Duane Smith, DEQ
Nancy Breuner, DEQ
Bonnie Lamb, DEQ



DEQ-DCI

RESOLUTION ADOPTING THE 2019 WASTE WATER FACILITIES PLAN UPDATE

RESOLUTION NO. 19-804-05) IN THE MATTER OF ADOPTING THE 2019
) UPDATE TO THE JOHN DAY WASTE WATER
) FACILITIES PLAN AND FINDINGS RELATED
) TO THE REPLACEMENT OF THE EXISTING
) WASTE WATER TREATMENT FACILITY
) IN THE CITY OF JOHN DAY.

WHEREAS, the John Day city council adopted a Waste Water Facilities Plan (WWFP) in 2010; and

WHEREAS, the City conducted a feasibility study in 2017 to evaluate the use of reclaimed water as a new alternative that was not considered in the 2010 WWFP; and

WHEREAS, the City's engineers completed the feasibility study in 2018 and determined that a new facility could be constructed to economically reclaim both solid and liquid waste streams and put them to beneficial reuse; and

WHEREAS, the 2019 update to the 2010 WWFP incorporates these findings and has been submitted for final review and approval by the Oregon Department of Environmental Quality; and

WHEREAS, replacement of the existing Waste Water Facility erected in 1949 is necessary in order to correct inadequacies in the waste disposal system and to meet future permitting requirements for treatment and disposal of the city's wastewater; and

WHEREAS, the age, condition and capacity of the existing facility, if not replaced, could result in a health or sanitary problem for residents as well as wildlife based on the facility's proximity to the John Day River;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF JOHN DAY AS FOLLOWS:

Section 1: The city council hereby adopts the 2019 Update to the 2010 WWFP.

Section 2: The city council finds replacement of the existing treatment facility to be a health priority for the City and that the current facility constitutes a sanitary problem in violation of the John Day Public Nuisance Ordinance No. 15-165-03, specifically the Derelict Structure clause requiring remediation of any building or structure that is in a condition of deterioration and whose deterioration would be injurious to public health, safety, or welfare.


Section 3: This Resolution shall be effective following its adoption by the city council.

Passed by the John Day city council this 12th Day of March, 2019.

ATTEST:



Ron Lundbom, Mayor



Nicholas Green, City Manager

13 November 2020

Memorandum

To: Nicholas Green, City Manager
John Day, Oregon

From: Kennedy Jenks; Dean Wood, Michael Humm, PE

Subject: Site Walk Findings – October 29,2020
K/J 2076017.00

Kennedy Jenks (KJ) staff (Dean Wood, Michael Humm, Amanda Mesick) completed a site tour of the John Day Wastewater treatment Plant (WWTP) on 29 October 2020. The purpose of the visit was to obtain site data and information needed to complete an alternative evaluation as part of the scope of work contracted under Flagline Engineering. This evaluation is expected to include performance and cost based comparisons of 3 treatment process alternatives, including one option which evaluates the ability to rehabilitate the existing WWTF. The objective of the evaluation is to determine the best cost solution meeting the City's discharge permit requirements. Each alternative must provide the same level of service and operational life expectancy across each alternative.

The purpose of this memo is to document the observations and initial findings of the site visit and the potential impacts to rehabilitating the existing WWTP.

Age

Generally, the equipment is all of the same original installation; design drawings obtained during the sitewalk are dated 1978, far exceeding an expected 20 year lifecycle on major treatment plant equipment.

Resulting approach to alternative evaluation: the age of equipment was expected prior to the site walk. All mechanical equipment will need to be replaced in the rehabilitation option.

Concrete Structures

Concrete basins including both the primary clarifier and the secondary clarifier, and the trickling filter flow splitting structure were found to have visible cracking with active seepage. (Photos 1-2). The cracking appeared to be uniform across the basins and may be indicative of a poor cold joint developed during initial concrete placement. Repair of this type of condition in this age of concrete is difficult and can have limited success.

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Nicholas Green, City Manager

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2076017.00

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The primary (heated) digester and secondary (unheated) digester were both found to be in near failing condition. The primary digester has significant concrete deterioration at the roof and digested sludge overflow vault. (Photo 3). Digester lid equipment, including flame resistors, pressure relief valves, and gas handling piping was corroded and may provide limited functionality. An access port in the primary digester lid was significantly corroded and had been dislodged from the digester roof (Photo 4). This penetration allows passive venting of digester gas and creates a significant safety concern. The secondary digester lid is a floating steel lid. Digester contents had overtopped the floating lid and the lid remains stuck and unable to travel. (Photo 5)

Resulting approach to alternative evaluation: the ability to reuse existing concrete tankage is very limited. The active weeping across many of the structures is concerning and indicates the basins are at or near the useful life of the structures. Repair methods, particularly on the clarifiers with the fluted architectural exterior are going to be very difficult and costly and even with repair, the crack will never be fully restored to a remaining life similar to what a new concrete structure would provide. The findings suggest if the existing site is to be used for continued WWTP operations, new basins would need to be constructed.

Primary and secondary digester roof replacement is needed. Operations staff indicate the primary digester mixer has significant bearing issues and there is no known condition assessment of either digester's interiors. The ability to reuse the digesters is unknown, but based on roof top condition and aging and leaking concrete structures onsite, the ability to rehabilitate the digester is unlikely.

Hazardous (Classified) Locations

The control building is located at the center of the plant. The building encompasses many unit processes; it is common walled with the below grade influent wet well, common walled and directly above the below grade trickling filter effluent wet well; the building interior shares common walls with both the primary and secondary digester, the building includes gas piping and gas handling equipment such as sediment and condensation traps, and the control building houses the WWTP main power feed, motor control centers, and SCADA control terminal.

The equipment within the control building includes influent pumps, a self priming engine driven influent pump, trickling filter effluent pumps, sludge pumps, gas handling equipment, a boiler, as well as an active workshop/tool bench. The control building has a connected laboratory and is also common walled to the adjacent gaseous chlorine room.

The central control building presents challenges, specifically related to NFPA 820, the *Standard for Fire Protection in Wastewater Treatment and Collection Facilities*. NFPA 820 is an industry

Memorandum

Nicholas Green, City Manager
 13 November 2020
 2076017.00
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standard, that Kennedy Jenks uses prescriptively, which is a common approach in the wastewater industry.

Based on the site walk and review of as-built information, the existing control building layout triggers several classification criteria with NFPA 820: influent pumping (Table 4.2.2 Row 17), sludge pumping (Table 6.2.2(a) row 9), and anaerobic digester gas handling (piping) (Table 6.2.2(a) Row 17). Each of these criteria trigger the need for ventilation requirements. Without nameplate data of the ventilation system, we are unable to determine exact classification, however, if less than 12 air changes per hour as determined by the presence of gas handling equipment, the entire building space is classified as Class 1 Division 1. If air changes exceed 12 air changes per hour, the building space is classified as Class 1 Division 2, except within 5 feet of the digester walls. In addition to ventilation criteria, the standard also prescribes air monitoring and alarming.

Figure A.6.2(e) is an illustration of Row 17 and the presence of sludge gas piping and gas processing equipment as found in the control building during our site walk.

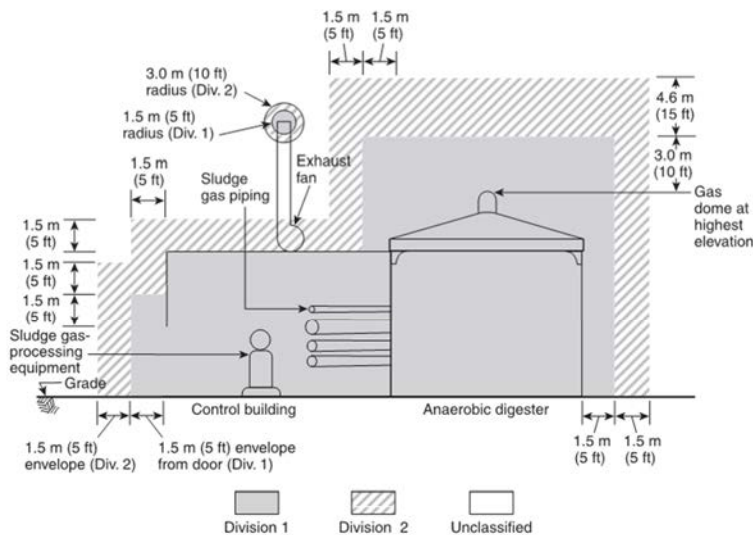


FIGURE A.6.2(e) Anaerobic Digester Control Building Containing Sludge Gas-Processing Equipment not Physically Separated and Using Ventilation Method (A); Illustration of Table 6.2.2(a), Row 17.

Resulting approach to alternative evaluation:

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Ventilation improvements may be able to bring the existing space to a Class 1 Division 2 rating, however Class 1 Division 1 space will remain within 5' of the existing digesters. Replacement of existing motors and equipment is pervasive and requires all rated equipment to be installed. Additionally, a new electrical room outside the classification space would be required for the motor control center.

Flood Plain

The City of John Day provided Kennedy Jenks with flood plain mapping prior to the site visit. The mapping indicates the existing plant is within the flood plain. While onsite, the operations staff described how the John Day river overtops its banks upstream of the plant, but due to the low lying site, the WWTP becomes flooded. Plant staff have historical knowledge of past flooding events. Flood plain elevations indicate the floodwaters are estimated to be 6' to 9' above existing grade onsite at the WWTP, including the threshold elevation into the control building.

Resulting approach to alternative evaluation: Top of wall elevations in both process basins and electrical and control buildings would be required to be above the flood plain elevation. This essentially eliminates the ability to reuse structures, the control building, and the overall layout of the existing treatment plant. This assumes that filling within the floodplain, such as constructing a dike around the perimeter of the property is not permissible.

Site Conclusions and Next Steps

Overall the treatment plant was found to be in marginal to poor condition. The greatest challenge in continuing to use this site is the need to address the flood plain issues. Without a dike system, all new taller facilities above the floodplain elevation would be required. This approach essentially results in a new treatment plant but with the added complexity of trying to design and then construct the plant while working in, around, and with existing treatment works. Construction of this nature is typically wrought with challenges including temporary operations, bypass pumping, temporary electrical and control feeds, and overall more challenging design and construction resulting in a longer duration construction period with greater change order risk.

With these findings, the existing site does not present the City with a viable alternative given expected cost for rehabilitation of all structures and complexity to maintain operations while continuing to meet the City's discharge permit requirements.

Enclosure(s) (Photo Attachments)

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Photo Attachments



Photo 1 – Primary Clarifier – concrete cracking/weeping

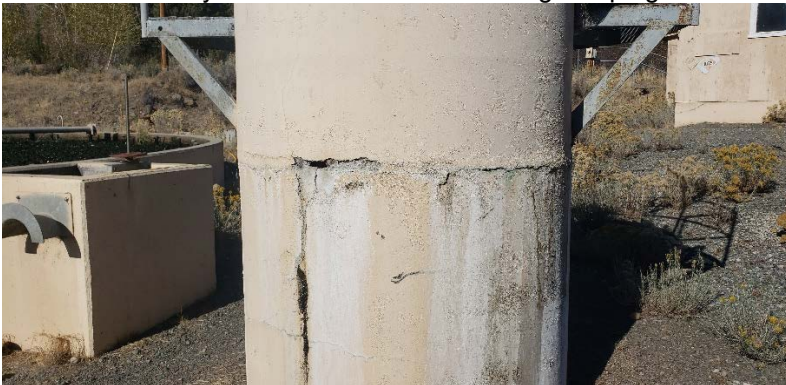


Photo 2 – Trickling Filter flow splitting structure – concrete cracking/weeping



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Photo 3 - Primary Digester roof – concrete corrosion



Photo 4 - Primary Digester roof – penetration failure – passive venting



Photo 5 - Secondary Digester roof – failed floating lid