CITY OF JOHN DAY WASTEWATER SYSTEM IMPROVEMENTS PROJECT

Biological Assessment

Steelhead – Middle Columbia River Distinct Population Segment

Bull Trout – Columbia River Distinct Population Segment

Grant County, Oregon
Dog Creek – John Day River
170702010608 (6th Field HUC)
&
Luce Creek – John Day River
170702010902 (6th Field HUC)

Prepared for:
City of John Day
450 East Main St.
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MB&G Project No. 0104397

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1.0 INTRODUCTION

The purpose of this Biological Assessment (BA) is to address the effects of the proposed John Day Wastewater Treatment System Improvements Project (project) on fish species listed as threatened under the federal Endangered Species Act (ESA) of 1973. The City of John Day (City) has received funding from the U.S. Department of Housing and Urban Development (HUD) in the form of a Community Development Block Grant to support the design and implementation of the project. The City is also applying for funding from the U.S. Department of Agriculture (USDA) through the Rural Utilities Service Water and Environmental Programs for the project's construction. USDA is the lead federal agency for ESA compliance for the project under a co-agency agreement with the City. Section 7(a)(2) of the ESA requires USDA to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of an ESA-listed species or result in the destruction or adverse modification of designated critical habitat. The HUD and USDA funding used for the project is a federal action for purposes of Section 7(a)(2).

The species' populations addressed in this document are steelhead (*Oncorhynchus mykiss*) of the Middle Columbia River (MCR) Distinct Population Segment (DPS) and bull trout (*Salvelinus confluentus*) of the Columbia River (CR) DPS. MCR steelhead populations are under the jurisdiction of the National Marine Fisheries Service (NMFS), and CR bull trout populations are under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). Consultation is accomplished, in part, through this BA, which evaluates the potential effects the proposed project will have on these species and their corresponding designated critical habitat. Conservation measures are identified in this BA to avoid or minimize potential adverse effects of the proposed project on these species and their designated critical habitat. The project description and effects analyses described herein comply with the requirements of Section 7 of the ESA.

Appendix A of this BA contains relevant project plan sheets, figures, and stormwater management plan. Appendix B contains photographs of the project Action Area and Appendix C contains the project's Groundwater and Surface Water Monitoring Plans.

2.0 PROJECT BACKGROUND

The City's existing wastewater treatment system was constructed in 1949, with major improvements occurring in 1970 and 1978. The existing system includes a wastewater treatment facility (WWTF) and a wastewater collection system. The existing WWTF primarily consists of a wet well, headworks, two primary clarifiers, two trickling filters, a secondary clarifier, a primary and secondary anaerobic digester, four sludge drying beds, a chlorine contact basin, and four percolation ponds. The collection system comprises approximately 84,145 linear feet (LF) of gravity sewer pipe ranging from 4 to 18 inches in diameter, approximately 10,528 LF of pressurized sewer pipe ranging from 4 to 8 inches in diameter, three lift stations, maintenance holes, and cleanouts. The system serves an estimated 1,036 households in addition to businesses, public agencies, and industries. The WWTF and collection system has many components that have surpassed their service life and need to be replaced to meet current Clean Water Act and Oregon Department of Environmental Quality (DEQ) standards and to meet projected population growth.

Relocating the WWTF to the proposed new location will place the new facility outside of the Federal Emergency Management Agency's (FEMA) Special Flood Hazard Area for the John Day River and fulfills a vital component of the City's goals for restoring the John Day River through the City. The site proposed for the new WWTF is located outside of the John Day River's 100-year floodplain based on updated flood hazard mapping that FEMA accepted in 2019.

The City is located approximately 1 mile north of Canyon City in Grant County at the intersection of U.S. Highways 26 and 395. The City has a total area of roughly 1.87 square miles. The John Day River flows east-to-west through the City, and several small creeks, including Davis Creek, empty into the river within and adjacent to the City's limits. Elevations in the project area vary from 3,000 to 3,100 feet. The project is located on two parcels entirely within the City-owned property. The proposed project is situated in the Dog Creek – John Day River (170702010608) and Luce Creek – John Day River (170702010902) 6th Field Hydrologic Unit Codes (HUC); Township 13 South, Range 31 East, Sections 22 and 23 (Figure 1).

Parts of the proposed project will occur within 500 feet of the John Day River, resulting in new pollutant-generating impervious surfaces and a new wastewater treatment and release system in the vicinity of the river. As such, the project has the potential to affect federally listed steelhead of the MCR DPS and bull trout. These listed fish species could occur in the vicinity of the proposed project at various times of the year. In addition, proposed project activities can potentially affect designated critical habitats for both species. This report only addresses the potential project effects on steelhead and bull trout (Table 1).

Table 1. Summary of Listed Fish Species Included in this Consultation.

Species	Scientific Name	Population	Jurisdiction	Federal Status	Designated Critical Habitat	Potential Site Use
Steelhead	*Oncorhynchus mykiss*	MCR DPS	NMFS	Threatened[1]	John Day River	Migration and limited Rearing
Bull Trout	*Salvelinus confluentus*	Columbia River DPS	USFWS	Threatened[2]	John Day River	Migration

[1] 70 FR 52630, [2]75 FR 63898

2.1 John Day Municipal Water Supply

The City's municipal water supply is provided by nine municipal water rights. Six rights are for groundwater sources, and three are associated with the Long Gulch Spring, located southeast of the City's downtown area. The City possesses six water rights for five groundwater production wells ranging from 180 to 310 feet deep (CwM 2022). Five of the six water rights are perfected, and one remains in the permit stage with the Oregon Water Resources Department (OWRD). Groundwater accounts for approximately 61% of the overall supply (Chadwick Consulting 2015). Only two wells, Well 3 and Well 5, regularly contribute to the water supply, with Well 5 being the primary producer (approximately 37% of the overall supply) (CwM 2022). Well 4 is a redundant well for use in the case of an emergency.

Figure 1.
Vicinity Map

Action Area

Urban Growth Boundary

MASON, BRUCE & GIRARD

Source: Basemap from Bing; Inset basemap from ESRI; Action Area drawn by MB&G; UGB from Oregon Open Data Portal. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility

N

0 1,500 3,000 6,000 9,000 Feet

City of John Day Wastewater System Improvements Project
John Day, Grant County, Oregon

The City also possesses three water rights associated with Long Gulch Springs near Canyon Creek. Although the three surface rights amount to nearly 5.1 cubic feet per second [2,285 gallons per minute (gpm)], the available information suggests that the flow rate of the spring is limited to about 60-80 gpm (CwD 2022). The Long Gulch Spring's consistent flow accounts for about 39% of the City's overall municipal water supply (Chadwick Consulting 2015). The City only diverts a portion of Long Gulch Springs' flow. Other water rights holders also use the spring. Water usage from each well (except for Well 1, which is not currently utilized) and from Long Gulch Springs is metered, and the water produced from the sources is recorded monthly. The City has a meter at Reservoir No. 1 that tracks the amount of water taken from the Long Gulch Springs by the City. The City consumes an average of approximately 3.5 million gallons per month from Long Gulch Springs.

The City has six water storage reservoirs. One of the reservoirs (Reservoir 1) stores untreated water from Long Gulch Springs, and the other five reservoirs (Reservoirs 2 - 6) store chlorinated water. The untreated water storage capacity of Reservoir 1 is 75,000 gallons, and the treated (by chlorination) water storage capacity of Reservoirs 2 - 6 totals 2,333,000 gallons (Chadwick Consulting 2015).

Because of the elevation variations within the service area of the City's water system, the system is divided into six separate pressure zones. City wells pump directly into the Main Distribution System, the city's largest and lowest pressure zone City. Water from Long Gulch Springs flows by gravity to Reservoir 1, is chlorinated as it flows from Reservoir 1 into Reservoir 2, and then is pumped from Reservoir 2 into either the Upper Ferguson Road System or the Main Distribution System. Water is pumped from the Main Distribution System into the Ironwood Subdivision System at the Ironwood Booster Pump Station. Water is pumped from the Main Distribution System into the Crisp Heights System through a sequence of two booster pump stations. The water is first pumped by the Crisp Heights Lower Booster Pump Station and then pumped again by the Lower Airport Booster Pump Station. To serve the Airport System, water is pumped from Reservoir 3 by the Upper Airport Booster Pump Station.

All water sources in use (*i.e.,* Wells 2 - 5 and Long Gulch Springs) are currently in compliance with state drinking water standards outlined under Oregon Administrative Rule 333-065 (Chadwick Consulting 2015). Withdrawals from Wells 2 - 5 are disinfected with gaseous chlorine. Water produced from Long Gulch Springs is treated with chlorine tablets as it flows between Reservoir 1 and Reservoir 2. Chlorine tablets are also used at times in adequate residual chlorine levels in Reservoir 6. Well 1 has not been used for many years and does not currently have a chlorination system in place.

The City implements several measures to conserve water usage within the system's service area (Chadwick Consulting 2015). The City monitors its customers' water usage and notifies them if usage rates are unusually high. The City utilizes leak detection equipment to investigate suspected leaks and provides maintenance or replacement of flow meters that are not working correctly. The City has adopted a rate schedule that bases the charges for water usage on the amount of water used. Additionally, the City provides water conservation information in the quarterly newsletter that is sent out to customers with their water bills. Pamphlets with that information are also displayed on a bulletin board at City Hall. Besides efforts expended by the City, the local electric company (Oregon Trail Electric Cooperative), offers local water users low-use water faucets and showerheads in an attempt to reduce power and water usage. The City's water consumption rate is quite low for a small city in the eastern Oregon region. Anderson-Perry & Associates, Inc. (2015) lists the average per capita water usage for 22 metered water systems of small cities in eastern Oregon and eastern Washington. After excluding John Day from that list, the average per capita water usage of the 21 remaining cities is 284 gallons per

capita per day (gpcpd), and only one of the 21 cities has a lower per capita usage rate than John Day (*i.e.,* 170 gpcpd for Lostine, Oregon). The low usage rate in John Day is attributed partially to the steps taken by the City to reduce water use (Chadwick Consulting 2015).

2.2 Existing Wastewater Treatment System Water Use

The City's existing WWTF treats wastewater that originates from the City's water supply described above. The existing facility discharges treated wastewater to four percolation ponds located west of the existing WWTF facility and east of the proposed WWTF site. The percolation ponds store treated (Class B) wastewater rather than raw/untreated sewage seen in a typical wastewater lagoon system. The percolation ponds are not covered and expose treated wastewater to solar heating and evaporation in addition to biological uptake. As such, an undeterminable amount of the treated wastewater does not percolate through the pond substrate back into the groundwater aquifer, resulting in a net loss of water placed back into the groundwater system. The City also uses its municipal water supply to irrigate City open spaces and properties. The irrigation water right is associated with the Long Gulch Springs right/source.

3.0 EVALUATION METHODS

Factors considered in evaluating potential project effects on steelhead and bull trout include the species' dependence on specific habitat components that may be modified, the abundance and distribution of habitat, habitat components in the project vicinity, distribution, and population levels of the species (if known), the possibility of direct effects to individuals, the degree of effects to habitat, and the potential to mitigate the adverse effects. These factors are relevant both for the survival of individuals of the species and populations, as well as recovery prospects for the species.

For steelhead, this document considers parameters outlined in *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996). For bull trout, this document considers parameters outlined in *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* (USFWS 1998). The method of analysis used in this document is to determine the environmental baseline for the Action Area, evaluate how the proposed action will affect the environmental baseline, and then use that information to arrive at a determination of effect for steelhead, bull trout, and associated critical habitat.

Information contained in this document was collected through a series of communications with the project design team and resource agency staff, including meetings, site visits, telephone calls, and electronic mailings. Specifically, the proposed project has been discussed with Stephan Charette (ODFW), Laura Navarrete (USFWS), and Rebecca Viray (NMFS). Additional research was conducted on fish presence and habitat conditions within the Action Area, including existing species database information (NOAA 2022a, StreamNet 2022, and USFWS 2022a).

A Mason, Bruce and Girard, Inc. (MB&G) biologist conducted a site visit within and around the Action Area on June 3, 2022, to evaluate habitat conditions for ESA-listed species and general site conditions to determine the general environmental character of the Action Area. During the site visit, aquatic, riparian, and upland areas within and around the project sites were examined and photographed (Appendix B).

Given the scale and scope of the project, this document has been specifically written to be as streamlined as possible while accomplishing the goal of providing USFWS and NMFS with the information necessary to concur with the ESA effects determinations provided herein. Information relative to species' life history and watershed dynamics is generally incorporated into this document via reference. This document focuses only on the specific construction and WWTF operational activities that may directly affect steelhead and/or bull trout.

4.0 PROJECT DESCRIPTION

4.1 Project Description Overview

The proposed project will result in approximately 10 acres of ground disturbance and includes the following three primary actions that are discussed in more detail in Section 4.2:

1) Construction of a new Class A WWTF with treated effluent discharge piping and groundwater trenches. Disposal of treated effluent will involve a new groundwater discharge system east of the new WWTF.
2) Demolition of the existing wastewater treatment facility on NW 7th Avenue.
3) Collection system upgrades, including rehabilitation of the siphon under the John Day River and upgrading two lift stations on City property.

4.2 New Wastewater Treatment Facility

The new WWTF will allow the City to meet all existing and predicted DEQ water quality requirements administered through the National Pollution Discharge Elimination System by removing nutrients and metals from the City's wastewater before delivery to the local groundwater aquifer. The new WWTF will be located approximately 0.5 miles west of the existing WWTF on cleared, graded land about 500 feet north of the John Day River that is accessible from Patterson Bridge Road. The area proposed for the construction of the new WWTF and the broader area encompassed by the Innovation Gateway Area Plan have undergone multiple remediation efforts to remove contaminants left from past land uses. The City purchased the former Oregon Pine lumber mill site from the D.R. Johnson Lumber Company in 2017 and had completed several remedial activities to remove hazardous media from the site. The Oregon Pine mill and associated timber processing facilities were located on the south side of the John Day River outside of the project Action Area. The mill used a portion of the Action Area where the new WWTF will be constructed for log storage. The City's contamination investigations and remediation actions for the Oregon Pine site are further discussed in section 5.2.

The new WWTF will encompass approximately 0.5 acre, including proposed effluent infiltration galleries, with about 0.75 acre dedicated to roadway access improvements and parking. Roadway access improvements as part of the WWTF project will consist of a short roadway segment that connects the new WWTF parking lot with 7th Street (west) Extension, which the City constructed in 2022 and 2023. Improvements to 7th Street are not part of the WWTF development or the proposed action discussed in this BA and serve a variety of mobility purposes including linking 7th Street Park and the new Industrial Park planned to be constructed north of the new WWTF with the City's road network. All components of the new WWTF and proposed roadway access improvements will be constructed outside of the riparian zone of the John Day River. Project components will include the installation of a gravity sewer line to the new WWTF location connected to the existing system, treated effluent piping, the primary treatment system (headworks), a packaged membrane bioreactor secondary treatment system, solids

digestion infrastructure, and emergency overflow wastewater conveyance piping to the existing percolation ponds. All elements of the proposed new WWTF will be constructed outside the river's 100-year floodplain and riparian zone. The proposed WWTF site has never been inundated by flood flows, including recent events in 2019 and 2020. Appendix A includes schematic drawings depicting the proposed WWTF improvements.

The City's Water Pollution Control Facilities Permit (WPCF) Permit No. 103281, includes separate standards for monitoring and reporting requirements for each of the three WPCF outfalls identified: 001: Infiltrated Water; 002: Recycled Water; and 003: Biosolids. Monitoring for Outfall 001 involves a unique groundwater and surface water plan. The required groundwater monitoring must include a representative section of the shallow alluvial aquifer up- and down-gradient of Outfall 001, possible cross-gradient monitoring points, and up-and-down-stream monitoring within the John Day River. The WPCF permit does not indicate the exact location, number, and design of monitoring wells/stations nor specify the field methods and techniques to be utilized. The City has determined such details in the WPFC Groundwater and Surface Water Monitoring Plans included in Appendix C. The City currently has seven groundwater monitoring stations and three instream monitoring stations downstream of the current WWTF and upstream of the proposed WWTF's location.

The City has determined the optimal monitoring structure, using current and future monitoring stations, to meet requirements per Division 40 Groundwater Quality Protection rules [Oregon Administrative Rules (OAR) 340-040-0030], to satisfy the required technical aspects of DEQ's Groundwater and Surface Water Monitoring Plan rules, such as sample collection and analysis methods (OAR 340-040-0030(B)) and data analysis procedures (OAR 340-040-0030(D)), and to address pre-consultation feedback from NMFS and USFWS regarding concerns for groundwater contamination from petroleum residues and metals that may still occur in the groundwater flow path. More information regarding groundwater and surface water monitoring is provided section 4.2.2 and Appendix C.

The new WWTF will include the following upgrades and primary components:

- Influent Pump Station and Headworks Screenings. A new influent pump station will be constructed to lift gravity sewer flows to the new treatment works. New influent screening is needed and will include, at minimum, one series of coarse screens (4–6-millimeter mesh size). Screened wastewater will flow through a de-gritting system before reaching the secondary process.
- Disinfection System. Ultraviolet disinfection will be employed to kill pathogens in the treated effluent. Disinfection would be sufficient to produce Class A recycled water.
- Secondary Treatment. A sequenced batch reactor (SBR) will provide secondary treatment. An SBR is a mixed batch reactor system that uses a five-step treatment process.
- Solids Processing Improvements. After aerobic digestion, the flow will move to a screw press or other solids thickening process before sludge hauling to a landfill. This system was designed to treat solids to meet Class B Biosolids standards and be beneficially applied on agricultural land in the surrounding area. The City is assessing its options to accept hauled waste but has not made a final decision on this practice at this time.

- Operational Buildings. New buildings will be constructed to house operations, headworks, and sludge thickening and dewatering. The operations building will include a laboratory for on-site wastewater analysis.
- Site Access. A new parking lot and access to 7th Street will be constructed for staff and visitors. Fencing will be installed around the facility for security.
- Treated Wastewater Discharge. Treated wastewater will be discharged into rapid subsurface infiltration galleries. Treated wastewater that meets the recycled water criteria will be used in a manner that does not adversely affect groundwater quality in the City's DEQ-approved Recycled Water Use Plan. The treatment facility system will be designed to produce recycled wastewater for beneficial reuse as irrigation. The WWTF will not directly discharge treated wastewater to surface waters; however, treated wastewater discharged to the proposed subsurface infiltration galleries is expected to enter the John Day River eventually through groundwater exchange with surface water downstream of the project site. This groundwater/surface water exchange is further discussed in sections 4.2.2.1 and 4.7.

4.2.1 Stormwater Management

The new WWTF will be constructed on the north side of the John Day River, accessible from Patterson Bridge Road and 7th Street. A paved driveway and parking lot will be placed on the south side of the new WWTF approximately 325 feet north of the John Day River to provide access to the facility from the 7th Street extension, which will be constructed as a part of the City's overall transportation system development. Construction of the 7th Street extension is not a part of the proposed action; the 7th Street extension will be constructed regardless of whether the new WWTF facility is constructed. However, stormwater management for the 7th Street extension near the proposed WWTF has been developed during WWTF stormwater management design for efficiencies and the similarities in the two projects' implementation schedule. Construction of the new WWTF and associated parking areas and the adjacent 7th Street extension segment will result in a total of approximately 2.28 acres of contributing impervious area that will require stormwater management. Approximately 1.55 acres of pervious area will also occur in the contributing zone for the proposed stormwater treatment system for an overall contributing area of 3.83 acres. All stormwater generated from the 3.83 acres of contributing area will be treated by the project's stormwater management plan per HUD stormwater treatment standards. Specifically, the proposed stormwater management system was designed to not only contain 100% of the water quality and quantity design storm events but will fully contain and process the 100-year, 24-hour storm volume.

Stormwater generated from the new WWTF and parking lot will be accommodated by on-site stormwater facilities constructed outside of the river's 100-year floodplain for the project-related new impervious surfaces. The new WWTF site has an existing swale on the property that will be improved for stormwater collection, treatment, and detention. The City also proposes construction of three other infiltration ponds to process stormwater generated from the 7th street extension segment. The water quality design storm (*i.e.,* 50% of the 24-hour, 2-year storm event) would produce a runoff volume of 5,726 cubic feet (CF) from the post-construction contributing drainage area. This volume includes runoff from contributing pervious and impervious surfaces. The four infiltration ponds were sized to not only contain 100% of the water quality and quantity design storm events, but will fully contain and process the 100-year, 24-hour storm volume, which produces 22,683 CF of storm runoff for the project

contributing area. The total storm volume storage capacity cumulatively for the four infiltration ponds is 30,277 CF.

The total storage volume of the proposed detention facilities is 30,227 CF, which is adequate to fully contain the 100-year storm event without discharge to the John Day River. Each stormwater facility has the capacity to handle more than the 100-year, 24-hour event and the design accounted for their capacity if overtopped. If overtopped, runoff will pond in the same general area, until it can infiltrate. Site topography generally sheds drainage away from the river, design and sighting of the facilities took this into account. A stormwater management plan for the proposed project is included in Appendix A.

The proposed stormwater management system meets all applicable criteria included in *NOAA-NMFS Stormwater Design Criteria for HUD Project in Oregon* (USDA 2016) for effects avoidance on listed species. Specifically, the proposed stormwater management system meets the following *No Effect* criteria for stormwater management per USDA 2016.

1) The project retains 100% of the water quality design storm onsite through infiltration, evaporation, or evapotranspiration best management practices (BMPs), as applied to the entire project site (*i.e.,* all impervious and landscape areas).

   The project's stormwater management system has been designed to treat stormwater generated from post-construction contributing impervious area beyond the project area's design storm event of 50% of the 2-year, 24-hour event. Specifically, the stormwater management system will treat and detain runoff from up to the entire 100-year, 24-hour storm event through evaporation and infiltration. The stormwater facilities will be situated on WWTF property and along the 7th street extension and will treat and detain stormwater generated from all new impervious surfaces associated with the proposed new WWTF and associated road improvements. The stormwater system exceeds HUD requirements of matching the pre-development discharge rates for flows from 50% of the 2-year 24-hour storm up to the 10-year flow event, the system is designed to detain and treat/infiltrate stormwater up to the 100-year storm event.

2) The project will not impact an area of natural habitat, a wetland, or riparian area.

   The project will not result in new or expand existing impacts in natural habitat, wetlands, or riparian areas. The WWTF and associated stormwater infrastructure has been sited outside of the John Day River's 100-year floodplain.

3) The project complies with all state and local building codes and stormwater regulations.

   The project complies with all local (City and county) building codes and stormwater regulations as well as DEQ stormwater regulations.

4) The project does not rely on underground injection control (UIC) methods to meet retention criteria.

   The project does not use UIC methods for stormwater management.

5) The project is certified by an engineer licensed to practice in the state of Oregon.

The stormwater management system was designed by:

Josef Hitz, PE
541-575-3777
Sisul Engineering
158 E. Main Street
John Day, OR. 97845

4.2.2 Wastewater Treatment and Monitoring

The proposed new WWTF and system will improve the quality of wastewater effluent discharged from the system compared the quality of wastewater effluent discharged from the existing system. The City currently operates its existing WWTF under WPCF Permit number 43569 with two numerical treatment criteria:

a. Greater than 85% BOD_5 removal

b. Maintain an average chlorine residual of 1.0 milligram per liter (mg/l) in the treated effluent.

Additionally, the existing WPCF permit requires that all wastewater shall be managed and disposed of in a manner that will prevent:

- A violation of the Groundwater Quality Protection Rules (OAR 340-040); and
- A violation of any permit-specific groundwater concentration limits established pursuant to OAR 340-040-0030, which have been subsequently incorporated into the permit.

The City has been issued a new WPCF permit (number 103281) that will be applied to the proposed new wastewater treatment facility. The effluent criteria in the new WPCF permit far exceed the criteria of the existing WPCF permit. The City's new WPCF permit effluent criteria requires the highest level of wastewater treatment currently available in the marketplace, tertiary treatment with full Class A Recycled Water disinfection standards across the full design flow of the WWTF. A comparison of the effluent qualities for the existing and new WPCF permits is provided below in Table 2. The new WPCF permit regulates Total Suspended Solids (TSS) and Total Nitrogen, two constituents that are unregulated under the existing WPCF permit. Additionally, more stringent effluent criteria are required for Class A recycled water discharges.

Table 2. Summary of Effluent Discharge Quality Standards for the Existing and Proposed WWTFs.

	Existing WPCF Permit Criteria			
	Effluent BOD		**Effluent TSS** (1)	
	2022	2042	2022	2042
Flow Event	lbs/day	lbs/day	lbs/day	lbs/day
Average Annual	66	71	71	77
Max Month Wet Weather	91	99	99	107
	Notes			

	New WPCF Permit Criteria			
	Effluent BOD (1)		**Effluent TSS** (1)	
	2022	2042	2022	2042
	lbs/day	lbs/day	lbs/day	lbs/day
	43	47	43	47
	81	85	81	85
	Notes			

1. No Existing Permit Criteria for TSS, assumed at 85% removal for purposes of this comparison 2. Existing Permit does not include limitations on Total Nitrogen.	1. 20 m/l monthly average BOD and TSS criteria. 2. Total Nitrogen limited to 5mg/l monthly average.

The proposed WWTF improvements have been designed to accommodate projected population growth in the City for the next 20 years. This growth projection is based on the City's Comprehensive Plan updates adopted in 2019. DEQ requirements and thresholds for groundwater and surface water quality compliance standards are set regardless of future wastewater treatment load increases or decreases.

4.2.2.1 Groundwater Modeling

The City has conducted a groundwater modeling effort to determine the potential influence of the proposed discharge of treated wastewater in the proposed subsurface infiltration galleries on local groundwater (CwM 2021). CwMH2O (CwM) employed three modeling programs to evaluate infiltration scenarios for the proposed WWTF's infiltration galleries: MODFLOW-6, MoundSolv, and Variably Saturated 2D (VS2D). The primary three-dimensional groundwater flow model was developed in MODFLOW-6 using the graphical user interface ModelMuse, both developed by the United States Geological Survey. The MODFLOW model incorporates the entire active extent of the alluvial aquifer (*i.e.,* the portion of the alluvial aquifer that controls and is affected by the proposed operation of the subsurface infiltration galleries). The MODFLOW model was responsible for simulating groundwater levels, groundwater flow paths (using the MODPATH package), and contaminant transport (using the MT3DMS package).

The MODFLOW-6 add-on package MODPATH was used to assess groundwater flow direction at the proposed WWTF in the alluvial aquifer. Tracking particles were placed at three depths within each of the model cells that comprised the infiltration galleries feature within the model grid, totaling about 150 particles. MODPATH tracking particles flow along with groundwater based solely on gradients. Therefore, modeled tracking particles do not exhibit any retardation factor, adsorption, or chemical reactions and, therefore, represent a conservative estimate for particle transport in the alluvial aquifer. CwM also modeled the dispersal area for nitrate, which experiences spreading via dilution and dispersion while traveling the groundwater flow path towards the river channel. The modeled nitrate plume is twice the concentration of the allowed treated effluent standard issued under the WPCF permit. As such, the concentration of the modeled nitrate plume is a conservative estimate and lower concentrations are expected to result after project implementation. The modeled nitrate discharge area is broader than the groundwater particle discharge zone discussed above and is further discussed in section 4.7 of this BA.

CwM used the two-dimensional VS2D model to conservatively model effects on groundwater temperature from the proposed effluent infiltration at the new WWTF. The model simulates the center or core of the infiltration plume where heat dispersion laterally through the aquifer is limited by the surrounding warm waters. The model demonstrates a potential maximum increase in groundwater temperature throughout the year in the WWTF infiltration plume of 2-4 degrees Celsius; however, over the width of the infiltration plume, increases on the order of approximately 0.5-1.5 degrees Celsius are likely more representative of the long-term operation of the new WWTF (CwM 2021).

The temperature modeling results do not show the thermal influence of the river in the hyporheic zone. Constant interchange between the river channel and the groundwater in the near-river environment (within several meters of the riverbank) exerts a regulatory effect on the temperature of groundwaters discharging to the river. Groundwater gradients also increase near the river/groundwater interface, leading to higher flow velocities and greater thermal dispersion. Such effects will likely suppress the thermal impact of the center of the plume below the values presented in the VS2D model. The model also assumes that the treated wastewater infiltrating through the infiltration galleries will be at a constant temperature of 20 degrees Celsius. Real-world operations of the infiltration galleries will likely lead to variability including lower influent temperatures in the winter and spring (CwM 2021). Finally, the VS2D model boundaries function as no-flux boundaries for water flow and for heat flow. This means that heat introduced to the aquifer from the river or from the infiltration galleries in the model cannot leave the model through the upper (land surface) or lower (confining unit) boundaries of the domain. Real world conditions would allow for continued heat dispersal downward into the confining unit, as well as evaporative and radiative heat loss from the land surface. The model, in effect, keeps more heat in the groundwater than should be the case. For these reasons, the estimates of warming in the groundwater aquifer (*i.e.,* 0.5 - 1.5 degrees Celsius) should be treated as conservative maximums (CwM 2021). Therefore, it is assumed that the proposed WWTF improvements and effluent infiltration will result in a very low likelihood that the proposed action will adversely affect water temperatures within John Day River due to the conservative assumptions in the modeling and the immediate mixing and dilution of the treated groundwater into the river. To ensure that the modeling assumptions are correctly estimating impacts to the riverine habitat, groundwater temperature will be monitored at locations identified in the groundwater monitoring plan to confirm that the proposed WWTF upgrades do not affect temperature conditions in the John Day River. DEQ concurred with this conclusion during permitting efforts for the proposed WWTF as discussed in section 4.2.4.3 below.

The groundwater modeling effort reviewed the potential for pollutants to reach the John Day River through infiltration of treated wastewater in the subsurface infiltration galleries. The modeling effort concluded that transformation of nitrate via denitrification in the aquifer will change the nature of the pollutant and thermal diffusion through aquifer material and this transformation is expected to help mitigate the potential thermal load that a direct release to the John Day River would experience (CwM 2021). Dilution and dispersion of the chemical or physical elements that define the treated effluent will further break down pollutants of concern in the treated wastewater in the groundwater environment (CwM 2021). Several groundwater processes that were not modeled, like adsorption and other biological processes, are expected to further reduce and transform any remaining wastewater pollutants in the groundwater environment. The proposed groundwater infiltration system is anticipated to further treat effluent while the effluent is in the groundwater aquifer via natural processes to concentrations that meet background or below background levels in the John Day River surface waters. As such, it is presumed that the proposed WWTF will not affect the existing water quality baseline of the John Day River. However, the possibility exists that treated wastewater may contain trace amounts of metals and/or encounter metals or other contaminants (*e.g.,* petroleum residues) after it is discharged into the infiltration galleries and passes through subterranean areas and the local groundwater aquifer. If the infiltrated effluent interacts with and mobilizes these contaminants, the possibly exists that the contaminants could reach the John Day River through groundwater exchange with surface waters and pose sub-lethal or lethal effect on steelhead and/or bull trout. As such, the City proposes groundwater and surface water monitoring to determine if the proposed WWTF is affecting the existing water quality baseline of the John Day River and its associated groundwater reserves at the

project site. More information regarding proposed groundwater and surface water monitoring is provided in Appendix C.

4.2.2.2 Wastewater Conservation and Reuse

As noted in section 2.2, the existing WWTF relies on percolation ponds to store and slowly release treated wastewater. The percolation ponds are exposed to solar radiation which is expected to result in some evaporative loss of processed wastewater. The ponds also support biological uptake of treated wastewater which is expected to remove an additional small amount of water from the ponds before discharge into the local groundwater aquifer. This results in a small amount of water lost from the system that would infiltrate back into the groundwater system. The proposed WWTF relies on the use of subsurface infiltration galleries that directly discharge treated wastewater into the groundwater aquifer without evaporative or biological loss that occurs in the existing percolation ponds. However, the proposed effluent discharge system is not expected to measurably change the amount of treated wastewater placed back into the groundwater system compared to the treated wastewater released to groundwater from the existing WWTF's release system because the John Day River balances the local, shallow alluvial groundwater system and the system's release rate and volume of groundwater to the river's surface waters. The John Day River is the primary, and in most months, the only contributor to the local alluvial aquifer groundwater supply other than treated wastewater. If more treated wastewater is infiltrated, less water will enter the aquifer from the river. If less wastewater is infiltrated, then more river water will enter the aquifer. Because the river balances the shallow alluvial groundwater system there is expected to be no net increase or decrease of groundwater in the alluvial groundwater system after project implementation.

The City proposes to reuse treated, non-potable wastewater from the proposed WWTF for irrigation needs on City property. As noted in Sections 2.1 and 2.2, the City currently uses water sourced from Long Gulch Springs for municipal irrigation needs. Reusing treated wastewater rather than water sourced from Long Gulch Springs specifically for irrigation is expected to result in higher system efficiencies and lower overall water withdrawal from the Long Gulch Springs water source. The proposed project will not affect the City's existing water rights or result in an increase in water consumption from the City's water sources. There will be no change from the current WWTF system to the proposed WWTF system that will adversely affect Long Gulch Springs flow volume as the City expects to continue to divert approximately 3.5 million gallons per month for local use and to treat whatever portion of that use makes it back to the new WWTF. However, there may be a reduction in water consumption from the springs based on water conservation efforts discussed in this BA.

4.2.2.3 DEQ Water Pollution Control Facilities Permit

As noted, the City has obtained a WPCF permit from the DEQ to authorize WWTF development and establish regulatory benchmarks and thresholds for effluent discharge, groundwater quality, and surface water quality (DEQ 2022). The permit establishes effluent limits that serve as the primary mechanism for controlling discharges of pollutants and lays out monitoring and reporting requirements for the City to ensure permit compliance for the duration of the permit through March 2032. DEQ's effluent limitations can be based on either the technology available to control the pollutants or limits that protect soil production and groundwater quality standards.

To ensure that a WWTF permit protects human health and the environment, DEQ must identify pollutants of concern. These are pollutants expected to be present in the effluent at concentrations that could adversely affect human health and the environment. DEQ uses the following information to identify pollutants of concern:

- Effluent monitoring data.

- Knowledge about the permittee's processes.
- Knowledge about the discharge methods.

For the City's WWTF permit, DEQ identified the pollutants of concern listed in Table 3.

Table 3. City of John Day WWTF DEQ Permit Effluent Pollutants of Concern.

Pollutant	How Was Pollutant Identified?
pH	Effluent Monitoring
Temperature	Effluent Monitoring
Pathogens	Effluent Monitoring
Nutrients	Effluent Monitoring
Inorganics	Effluent Monitoring
Organic Matter	Effluent Monitoring
Dissolved and Suspended Solids	Effluent Monitoring

The sections below discuss the analyses that DEQ conducted for the pollutants of concern to determine the appropriate effluent limits in the DEQ permit.

pH

The pH criterion for the John Day River watershed is 6.5 – 8.5 per Oregon Administrative Rule 340-041. With the proposed WWTF discharging to a rapid infiltration basin, DEQ established the permit limits to match the watershed's criterion to ensure there is no reasonable potential for the permitted activity to adversely affect regional groundwater quality.

Temperature

While temperature can be an issue for many wastewater facilities, the City is planning to reuse some of the treated effluent during the warm summer months and discharge the remaining water through rapid infiltration basins. Based on hydrogeologic modeling conducted by the City and reviewed by DEQ, the DEQ concluded that there is no reasonable potential for the City's discharge to adversely affect the temperature in the river. Limiting discharge to the infiltration basin during the winter months, along with the thermal sink of the subsurface and associated shallow aquifer, are anticipated to address any potential thermal plume associated with this discharge. While groundwater temperatures near the John Day River in the Action Area may rise from the infiltration of treated effluent into groundwater reserves by up to 0.5-1.5 degrees Celsius (CwM 2021), the potential for increasing surface water temperatures in the John Day River are expected to be negligible from operation of the proposed WWTF due to the conservative assumptions in the modeling and the immediate mixing and dilution of the treated groundwater into the river. To ensure that the modeling assumptions are correctly estimating impacts to the riverine habitat, groundwater and surface water temperature will be monitored at locations identified in the groundwater and surface water monitoring plans to confirm that the proposed WWTF upgrades do not affect temperature conditions in the John Day River.

Pathogens

Bacteria in wastewater can create public health concerns due to the potential for contracting diseases from pathogens. Frequently, concentrations of disease-causing pathogens are small, and the number of different benign pathogens is large. As a result, DEQ requires monitoring of pathogens by testing for an "indicator" organism such as coliform bacteria. *E. coli* come from the same sources as pathogenic organisms. *E. coli* are relatively easy

to identify, are usually present in larger numbers, and respond to the environment and wastewater treatment processes similar to many other pathogens. As a result, testing for *E. coli* bacteria can be a reasonable indication of whether other pathogenic bacteria are present. For the City's WWTF permit, DEQ is using the *E. coli* limits for secondary treatment, as shown in Table 4.

Table 4. City of John Day WWTF Effluent Coliform Limits.

E. coli (#/100 ml)	Monthly Average Limit	Single Sample Maximum Limit
Limit	126	406

Nutrients

Nutrients, such as nitrogen and phosphorus, are essential for plant and animal growth and nourishment, but the overabundance of certain nutrients in water can cause adverse health and ecological effects. Nitrogen, in the forms of nitrate, nitrite, or ammonium, is a nutrient needed for plant growth. But if it is discharged to groundwater, it can create health concerns and result in eutrophication of ground and surface waters. DEQ has established the nutrient limit in Table 5 for the City's WWTF to ensure the discharge protects human health and the environment.

Table 5. City of John Day WWTF Effluent Nutrient Limits.

Nutrient	Units	Monthly Average	Maximum Limit
Total Nitrogen	Mg/L	5	9

Inorganics

Inorganics, such as arsenic, selenium, and heavy metals, can be found in wastewater solids. In addition, inorganic compounds could be present in project area soils based on past land uses. They are essential for plant and animal growth in the right concentrations, but the overabundance of these compounds can be toxic to plants and animals. Very low concentrations of zinc and copper have been shown to affect salmonids' ability to fully carry out their specific life histories. DEQ is using the limits established in federal regulations (40 CFR 503.13) that are considered protective for human safety but may be above adverse effect thresholds for salmonids and other aquatic life (Table 6). The City has developed groundwater and surface water monitoring plans to assess and address potential changes to the John Day River environmental baseline as a result of the proposed action. The City will develop a comprehensive biosolids management and land application plan that will be reviewed and approved by DEQ prior to land application of biosolids based on the limits included in Table 6. Federal biosolid pollutant limits use the terms ceiling concentrations, pollutant concentrations, and cumulative pollutant loading rates. The City's DEQ permit complies with each requirement in 40 CFR 503.13.

Table 6. City of John Day WWTF Biosolids Inorganic Limits.

Nutrient	Units	Maximum Limits
Arsenic	Mg/kg	75
Cadmium	Mg/kg	85
Copper	Mg/kg	4300
Lead	Mg/kg	840
Mercury	Mg/kg	57
Molybdenum	Mg/kg	75
Nickel	Mg/kg	420
Selenium	Mg/kg	100

Nutrient	Units	Maximum Limits
Zinc	Mg/kg	7500

Organic Matter

When large amounts of organic matter accumulate in water, microorganisms utilize dissolved oxygen in the water to break down the complex organic compounds such as sugars, cellulose, and other organic substances. This microbial activity will proliferate, breaking down the organic matter and significantly reducing the dissolved oxygen in water, which can result in eutrophication. Biological oxygen demand (BOD) is one water quality parameter that is utilized to measure this activity. DEQ establishes BOD5 benchmarks to ensure the organic matter in the effluent has been sufficiently broken down. Table 7 provides the organic matter limits established by DEQ.

Table 7. City of John Day WWTF Effluent Organic Matter Limits.

Nutrient	Units	Monthly Average Limit	Weekly Average Limit
BOD5	Mg/L	20	35

Dissolved and Suspended Solids

Dissolved and suspended solids are materials entrained in groundwater and surface water. This material can include bicarbonate, chloride, phosphate, nitrate, calcium, sodium, organic ions, sand, silt, and other particulates. Total dissolved solids (TDS) is a measure of the amount of material dissolved in water which consists of dissolved ions, including salts, minerals, and metals. These particles are smaller than 2 microns. TSS is a measure of the amount of material that is suspended in the water. TSS materials exceed 2 microns and consist of organic matter, sand, silt, and other impurities. DEQ establishes TSS limits for recycled water and TDS limits at the groundwater compliance points to ensure the WWTF is working optimally and removing contaminants from the effluent. DEQ TSS criteria is listed in Table 8.

Table 8. City of John Day WWTF Effluent TSS Limits.

Nutrient	Units	Monthly Average Limit	Weekly Average Limit	Compliance Point
Total Suspended Solids	Mg/L	20	35	Outfall 001

Groundwater Monitoring

As noted, treated wastewater will be discharged into rapid subsurface infiltration galleries. The City's DEQ permit requires groundwater monitoring down gradient from the rapid infiltration basins to ensure effluent infiltration is compliant with state and federal groundwater protection regulations. The City has developed groundwater and surface water modeling plans based on WPFC permit requirements and pre-consultation feedback from NMFS and USFWS (Appendix C). Groundwater monitoring plans developed during pre-consultation with NMFS and USFWS will address concerns about toxicity thresholds for aquatic life that are below DEQ toxicity limits.

Surface Water Monitoring

The proposed WWTF does not involve discharge of treated effluent to surface waters, rather it involves direct infiltration to groundwater that provides a secondary water quality regulating affect before the infiltrated effluent moves through the groundwater aquifer and slowly discharges to the John Day River through natural groundwater/surface water exchange. The WWTF will be located outside of the John Day River floodplain. Due to the WWTF's proximity to the river, the DEQ permit requires the City to collect surface water samples from the John Day River. Pre-consultation with NMFS and USFWS has resulted in surface water monitoring for

additional constituents (*i.e.,* petroleum residues and metals) not monitored per DEQ permit requirements (Appendix C). Surface water samples will be collected upriver (to establish background) and downriver on a quarterly basis. The results of these samples will be evaluated to ensure the City's WWTF does not discharge pollutants to the John Day River.

4.3 Wastewater Flow Routing and New Sewer Pipeline

Wastewater influent will be routed from the existing WWTF's influent manhole to the new WWTF via an 18-inch diameter, gravity-fed pipe. The piping route runs along the north side of the existing percolation ponds and heads west to the new WWTF. The piping will be installed in a trench located approximately five feet below the ground surface, except where it will be bored under Davis Creek. The pipe will be directionally bored under the existing NW 7th Avenue culvert that conveys the creek under the roadway and the work will have no contact with the creek channel or surface water. The pipe boring will not require in-water work. The eastern end of the new influent pipe will be constructed immediately south of the existing WWTF under NW 7th Avenue. An approximately 150-foot-long section of the new pipe will be constructed along the road approximately 70 north of the John Day River. West of this section, the piping will run along NW 7th Avenue north of the existing percolation ponds at an average distance of 500 feet from the river. The piping will run along the north side of an emergency overflow pipe that will be constructed to relay emergency sewer overflows to the percolation ponds. The new sewer pipeline will span approximately 5,340 linear feet and the emergency overflow pipeline will span approximately 1,820 linear feet. West of the percolation ponds, the piping will run in a north/south alignment before turning west across cleared land to the new WWTF. Sections of the alignment west of the percolation ponds will occur within 500 feet of the river with the closest part of the western segment occurring approximately 110 feet from the river where the north/south alignment transitions to the east/west alignment towards the new WWTF.

The existing sewage influent siphon under the John Day River will be fitted with a pipe liner to rehabilitate the structure. The rehabilitation will be completed by accessing the inside of the siphon from existing manholes on either side of the river and working inside the structure. The existing manholes are located approximately 10 feet from the river's north and south top of bank. Thus, the rehabilitation will not require disturbance in previously undisturbed areas, in-water work, stream isolation, or fish salvage. The project also involves the replacement of existing duplex pumps and controls for the Patterson Lift Station located at the intersection of US 26 and Patterson Bridge Road as well as replacement of controls for the Bowling Lift Station at the north side of US 26 in the parking lot for Nugget Lanes. Work at the lift stations will occur in developed locations and not require in-water work or disturbance to undeveloped areas. An overview of the proposed wastewater flow routing, siphon, and lift station improvements is in Appendix A.

4.4 Existing Wastewater Treatment Facility Removal

The existing WWTF will be decommissioned and demolished over a four-month period once the new WWTF and new sewer pipeline are constructed, lift station upgrades have occurred, and the existing siphon has been rehabilitated. The existing WWTF will remain operational during a 30-day period after the new WWTF is operational and handling sewage loads to ensure seamless coverage of wastewater treatment needs. Once it is determined that the new WWTF is fully operational and able to take the City's full wastewater load, the City will switch a valve at the existing WWTF's headworks to send all of the City's wastewater influent to the proposed

WWTF. After the proposed WWTF is fully operational and handling the City's full wastewater load, the existing WWTF will be demolished. The site of the existing WWTF will be stabilized and eventually will be included in the City's nearby Davis Park expansion. Use of three of the four existing percolation ponds will be discontinued after construction of the new WWTF. The pond closest to the new WWTF will be used for emergency wastewater effluent overflow after construction of the proposed WWTF (Appendix A, Drawing A1.0). The City plans to eventually restore the area encompassed by the three decommissioned ponds to a more natural ecosystem.

4.5 Project Construction

Construction of the proposed WWTF will commence in 2024 and will proceed through December 2025. The proposed WWTF will be constructed prior to removal of the existing facility. The total project disturbance footprint is approximately 10 acres. The new WWTF will be constructed concurrently with the new sewer pipeline, siphon, and lift station improvements discussed in section 4.3. Prior to construction of the new WWTF, the new road (7th Street extension) accessing the site from Patterson Bridge Road and an associated driveway and parking lot will be constructed.

4.5.1 Construction Mobilization

Construction mobilization consists of site preparation in advance of primary construction activities. Mobilization activities include preparation and installation of environmental controls, and preparation of equipment and material staging areas. These activities will occur before initiation of primary construction activities. Environmental controls include establishment of clearing limits and "no-work" zones, as well as installation of erosion, sediment, and pollution control measures. Staging areas will be established in previously cleared and developed sites.

All erosion, sediment, and pollution control materials will be brought to the site and installed according to the Erosion and Sediment Control Plan (ESCP) and Pollution Control Plan (PCP) developed for the project by the construction contractor, and as required in the project specifications. Erosion and sediment control measures (*e.g.,* silt fence, straw wattles, etc.) will be installed, as necessary, down slope of project activities. Equipment and materials being used during construction will be staged in an area that contains no sensitive natural resources. All stored fuel will be kept in fuel storage containers and in a portion of the staging area designed for fuel spill containment.

Construction equipment will be inspected for leaks prior to mobilization to the project site and prior to operating within 150 feet of the ordinary high water mark of the John Day River. Any identified leaks will be repaired before operations within the project site. Non-tracked vehicles and equipment stored within 150 feet of the John Day River will be located within an area designed to prevent spilled fuel and other potentially hazardous materials from entering the waterway. Equipment fueling will not occur within 150 feet of the river and all stationary equipment that must stay within 150 feet of the river during construction (*e.g.,* cranes) will be fueled within a designated spill containment area.

4.5.2 New Sewer Pipeline

A temporary trench for the new 18-inch diameter sewer line will be excavated and the construction contractor will temporarily side-cast material from the trench. The majority of the pipeline trench will be constructed over 500 feet from the river; however, two segments will be constructed within 100 feet of the river. The pipeline

excavation will occur on flat land and will include erosion and sediment control measures that will avoid erosion and sedimentation impacts outside of the contained construction area. A bed of compacted crushed rock will be placed to serve as a foundation for the pipeline at the base of the excavation. The pipe will be placed on the aggregate bed, and additional rock will be placed around the pipe; the contractor will reuse native gravel and cobble where feasible to minimize the use of imported material and to minimize the removal of native material from the site. Next, the contractor will backfill the pipe trench with clean crushed rock aggregate and backfill the remaining area in the trench using the side-cast material. The new sewer line alignment traverses cleared, disturbed land. As such, limited woody vegetation removal will be required. No riparian vegetation removal will be required. After installing the pipe with a permanent erosion control seed mix, the contractor will stabilize the sewer line alignment.

4.5.3 Siphon Rehabilitation

The existing sewer siphon that spans under the John Day River near the existing WWTF will be rehabilitated. The construction contractor will use piped trenchless, slip-line technology to install a rigid, structural seal inside the pipe to extend the siphon's operational life. Slip-lining is completed by installing a smaller carrier pipe into a larger host pipe, grouting the annular space between the two pipes, and sealing the ends in the host pipe. The construction process will be conducted from existing manholes located in upland areas outside of the river channel approximately 10 feet from river's top of bank. As such, the proposed siphon rehabilitation will not involve in-water work and will not affect the river's physical or biological processes.

4.5.4 Existing WWTF Removal

As noted, the existing WWTF will be decommissioned and demolished over a four-month period once the new WWTF and new sewer pipeline are constructed, lift station upgrades have occurred, and the existing siphon has been rehabilitated. The decommissioning and removal of the existing WWTF will result in the permanent removal of approximately 0.5 acre of impervious surfaces and will occur within 500 feet of John Day River, removing a potential point source for pollutants (*i.e.,* stormwater) to enter the river. Removal of the existing WWTF will occur with erosion and sedimentation control and containment measures in place to avoid any construction-related impacts to the John Day River.

4.6 Conservation Measures

Conservation measures are intended to minimize or avoid environmental impacts to listed species and their habitats. Appropriate measures have been incorporated into the project design to minimize or avoid adverse effects to listed fish species and designated critical habitat. These measures address water quality maintenance, erosion and sediment control, containment of construction materials, handling of hazardous materials, vegetation disturbance, and site restoration. The City has developed the project to avoid impacts to ESA-listed fish species and Critical Habitat to the maximum extent practicable. The City proposes the following conservation measures for the project:

- The proposed WWTF and associated road and parking infrastructure have been sited outside of the John Day River's 100-year floodplain. The proposed WWTF site has never flooded.

- The WWTF system upgrades have been developed without in-water work or impacts to riparian vegetation.
- The project has been designed with a negligible removal of native vegetation.
- Stormwater runoff from proposed from all project-related contributing impervious surfaces will be treated and detained on-site in a manner that exceeds current HUD stormwater management standards for effects avoidance on listed fish. All runoff from up to the 100-year storm event will be completely infiltrated in on-site stormwater facilities.
- The City will conduct surface water and groundwater monitoring after project implementation to monitor any effect of the proposed WWTF on baseline water quality conditions per the monitoring plans included in Appendix C.
- Construction of the proposed action will be carried out per the ESCP and PCP specifically prepared for the project. Construction contract specifications will require the PCP to include measures for identifying, containing, removing, and disposing of contaminated media if contamination is encountered during earthwork associated with new influent pipeline and WWTF construction per the following construction specifications.
    - Segregate all demolition and construction debris according to its intended end use (reuse, recycle, or dispose). If required, store in designated areas in a manner that prevents contamination to Soil and water and prevents fugitive dust emissions.
    - If, during construction, unanticipated hazardous substances are discovered that threaten the health and safety of workers, the public, or the environment, do the following:
        - Immediately remove all affected employees and secure the area to prevent access.
        - Notify the Engineer/City immediately and provide written notification within 24 hours, setting forth a description of the hazardous substances encountered.
    - Excavate and handle contaminated soil from project excavations according to the following:
        - Field screen soil using a portable photo ionization detector, portable flame ionization detector, field test kits, or other instrumentation capable of detecting the contaminants identified for this Soil.
        - Segregate non-contaminated soil from contaminated soil during excavation activities, based on the field screening and the provided contaminated soil location information.
        - Load contaminated soil directly into trucks and transport directly to the recycling or disposal facility, or on-site reuse areas or, when approved by the Engineer/City, temporarily store contaminated soil on-site.
        - Obtain the Engineer's approval of the disposal facility before disposing of the Contaminated Soil.
        - Transport the contaminated soil to a DEQ permitted municipal solid waste landfill or a permitted construction and demolition landfill for disposal. Dispose of temporarily stored contaminated soils within 30 Days of beginning excavation work.
        - Complete and sign all manifests and bill-of-lading forms for handling, loading, transporting, and disposing of the contaminated soil.

4.7 Action Area

The Action Area includes all areas affected directly or indirectly by the federal action. The Action Area includes all uplands, riparian, and in-stream areas that will experience direct effects from the proposed project, as well as areas that could be indirectly affected by the project. The project will result in direct impacts to approximately 10 acres and will not involve in-water work. The proposed Action Area includes all construction and staging areas required to implement the project. The Action Area is depicted on Figure 2 and is further defined below:

- The Action Area includes the construction zone for the removal of the existing WWTF and construction of the new WWTF, including staging areas, erosion and sediment containment areas, construction of the groundwater infiltration galleries, and stormwater management facilities.
- The Action Area includes a 50-foot buffer around the new influent pipeline alignment (25 feet on either side of the pipe alignment) to account for the temporary trenching, equipment access/staging, side-casting material, and backfilling/re-contouring to match pre-project contours. Most of the pipeline trench will be constructed over 500 feet from the river; however, two segments will be built within 100 feet of the river (Figure 2). The pipeline excavation will occur on flat land and include erosion and sediment control measures to avoid erosion and sedimentation impacts outside of the contained construction area.

  The Action Area includes segments of the John Day River downstream of the proposed WWTF to account for groundwater particle and dissolved constituent movement through the alluvial aquifer before the groundwater empties into the river through natural groundwater/surface water interchange. These river segments represent a composite groundwater discharge area along the north bank of the John Day River based on 3-year model runs in MODFLOW including seasonal river stage variations. These distances and segments were determined based on the groundwater flow path and travel time modeling completed for the project to determine how and where groundwater particles in the alluvial aquifer interact with and enter the river based on the infiltration gallery locations and associated subsurface conditions (CwM 2021). The John Day River Action Area also includes the modeled dispersal area for nitrate, which experiences spreading via dilution and dispersion while traveling the groundwater flow path towards the river channel. The modeled nitrate plume is twice the concentration of the allowed treated effluent standard issued under the WPCF permit. As such, the concentration of the modeled nitrate plume is a conservative estimate and lower concentrations are expected to result after project implementation. The following paragraphs describe the four reaches where groundwater and nitrate dispersal into the river were modeled and included in the Action Area.

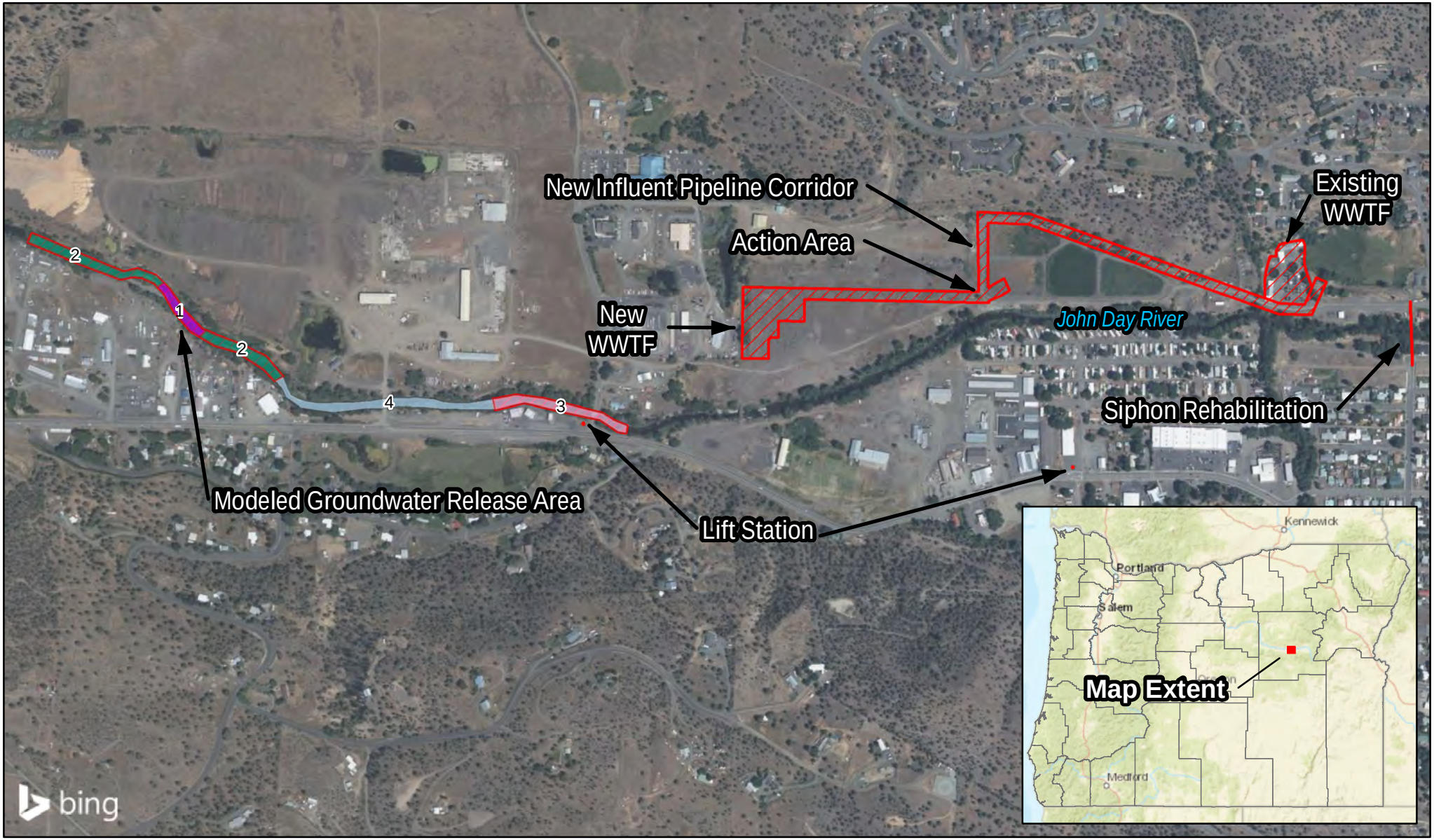

Figure 2.
Action Area

City of John Day Wastewater System Improvements Project
John Day, Grant County, Oregon

- Action Area
- 1; Primary Discharge Zone (within Action Area)
- 2; Possible Discharge Reach (within Action Area)
- 3; Possible Discharge Reach (within Action Area
- 4; Losing-stream Reach (outside of Action Area)

MB&G

Source: Basemap from Bing; Inset basemap from ESRI; Action Area drawn by MB&G; Discharge data from CwM; Counties from RLIS. Reproduced for informational purposes and may not be suitable for legal, engineering, or surveying purposes. Conclusions drawn from such information are the responsibility of the user.

N

0 375 750 1,500 Feet

1) Primary Discharge Zone (1): The Action Area segment along the John Day River labeled "1" represents the area that the particle tracks from the infiltration gallery end at the river. This area is where constituents of the infiltrated water not experiencing dilution and dispersion would discharge to the river and is approximately 380 feet long. While the actual infiltrated-water plume would be much wider, the primary discharge zone is indicative of the plume core where concentrations would be highest. Due to the travel time of the tracking particles through the aquifer, the modeled discharge zone did not change significantly by season. Figure 2 represents the Primary Discharge Zone across all seasons.

2) Possible Discharge Reach (2): The possible discharge areas labeled "2" on Figure 2 include the entire modeled plume area above a concentration of 1 ppm, or 90% dilution from an initial model concentration of 10 ppm. This area is much broader than the Primary Discharge Zone because it incorporates the effects of dilution and dispersion during flow through the aquifer. This zone represents areas of the river that could receive groundwater discharge with some diluted concentration of infiltration water from the gallery. The Possible Discharge Reach extends further on the downstream side of the plume core due to the orientation of the river in that area. Collectively, both reaches are approximately 1,380 feet long.

3) Possible Discharge Reach (3): The possible discharge area labeled "3" in Figure 2 is a separate area of potential discharge based on the results of low-end hydraulic conductivity modeling. Lower conductivity results in slower groundwater flow and transport velocities, forming a wider plume. In this model iteration, the southern edge of the plume is pushed towards the river by the prevailing groundwater gradient. Area 3 also represents possible discharge to the river in a higher conductivity aquifer in the case of very low river stage and relatively high groundwater levels (such as a wet spring followed by very dry summer with limited snow melt). Possible discharge reach 3 is approximately 820 feet long.

4) Losing-stream Reach (4): The area labeled "4" on Figure 2 is approximately 1,310 feet long and represents a section of the river that the model consistently found was a losing reach. Because of the river level, adjacent ground elevation, and aquifer thickness, the model indicated that water from this section of the river typically recharges the aquifer. This is demonstrated by the downstream bends in the groundwater contours in this area. For this reason, infiltrated water from the gallery never discharged to this reach in any model run. Instead, flow paths heading towards that area are pushed downstream to Areas 1 and 2. As such, area 4 is not included in the Action Area.

5.0 NATURAL HISTORY AND SPECIES OCCURRENCE

5.1 Middle Columbia River Steelhead

Steelhead of the MCR DPS were originally listed as threatened on March 24, 1999 (64 FR 14517), reaffirmed as threatened on January 5, 2006 (71 FR 833), and updated on April 14, 2014 (79 FR 20802). The MCR Steelhead DPS includes naturally spawned anadromous *O. mykiss* (steelhead) originating below natural and manmade impassable barriers from the Columbia River and its tributaries upstream of the Wind and Hood Rivers (exclusive) to and including the Yakima River and excludes such fish originating from the Snake River basin. This DPS includes steelhead from the following artificial propagation programs: Touchet River Endemic Program, Yakima River Kelt Reconditioning Program (in Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River), Umatilla River Program, and Deschutes River Program. This DPS does not include steelhead that are designated as part of an experimental population. For additional information on the general habitat requirements, life history, and limiting factors for recovery of MCR steelhead see the Federal Register Notice published on January 5, 2006 (71 FR 833).

Steelhead use of the Action Area is primarily limited to adult upstream spawning migrations and juvenile downstream outmigrations (Stephan Charette, ODFW, pers. comm., June 7, 2022). Adult steelhead migrate through the Action Area in January with upstream spawning occurring between April and early June (Stephan Charette, ODFW, pers. comm., June 7, 2022). Juvenile steelhead outmigration can occur in October and November if river temperature and flow conditions are favorable, with the primary outmigration period between April and early June. Juvenile steelhead are not expected to consistently rear in the reach of the river that flows through the City and adults are not expected to spawn in this area (Stephan Charette, ODFW, pers. comm., June 7, 2022). However, the SteamNet fish distribution database indicates some juvenile rearing may occur in the project area (StreamNet 2022).

5.1.1 MCR Steelhead Critical Habitat

Critical Habitat for this DPS was originally designated on February 16, 2000 (65 FR 7764). On April 30, 2002, the U.S. District Court for the District of Columbia approved an NMFS consent decree withdrawing Critical Habitat designations for this and 18 other salmon and steelhead trout populations on the West Coast. The move was in response to litigation challenging the process by which NMFS established Critical Habitat. On November 30, 2004, NMFS published a proposal to revise and re-designate Critical Habitat for this ESU. Critical Habitat for this DPS was re-designated on September 2, 2005 (70 FR 52630) and became effective on January 2, 2006. Critical Habitat includes the stream channels within the designated stream reaches, and includes a lateral extent as defined by the ordinary high water line (70 FR 52630). The John Day River is designated Critical Habitat for MCR steelhead (NOAA 2022a).

5.2 Bull Trout – Mid Columbia Recovery Unit

The Columbia River Bull Trout DPS was listed as threatened under the ESA on June 10, 1998 (63 FR 31647). The Columbia River population segment is represented by widespread subpopulations that have declined in overall range and numbers of fish. A few remaining bull trout “strongholds” occur in the Columbia River basin. These populations are found in large areas of contiguous habitats in the Snake River basin of the central Idaho mountains, upper Clark Fork and Flathead Rivers in Montana, and several streams in the Blue Mountains in

Washington and Oregon (63 FR 31647). The USFWS considers this DPS threatened because of habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, and the introduction of non-native species (63 FR 31647 and USFWS 2015). In the John Day River basin, the USFWS identified the factors that most limit bull trout populations as the alteration and degradation of instream habitat, which results in the loss of instream structure, pools, and side-channel habitats (USFWS 2015).

The Mid-Columbia River Bull Trout Recovery Unit is located within eastern Washington, eastern Oregon, and portions of Idaho. Major drainages include the Yakima River, John Day River, Umatilla River, Walla Walla River, Grande Ronde River, Imnaha River, Powder River, Clearwater River, and small drainages along the Snake River and Columbia River. The Mid-Columbia Recovery Unit includes 24 occupied core areas in four geographic regions. The John Day River core area occurs in the Lower Mid-Columbia recovery geographic region (USFWS 2015).

Bull trout are char native Washington, Oregon, Idaho, Nevada, Montana, and western Canada. Compared to other salmonids, bull trout have more specific habitat requirements that appear to influence their distribution and abundance (USFWS 2022b). They need cold water to survive, so they are seldom found in waters where temperatures exceed 59 to 64 degrees (F). They also require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors (USFWS 2022b). Bull trout distribution in the John Day River basin is highly fragmented and constricted to headwater streams due to their specific habitat requirements (ODFW 2005). Adult and sub-adult bull trout seasonally utilize the entire North Fork John Day River for rearing and foraging, and in the upper mainstem John Day River they are suspected to forage downstream to the vicinity of the City of John Day (ODFW 2005). Migratory bull trout have been captured in the mainstem John Day River near the town of Spray; however, use of the lower reaches is sporadic due to warm water temperatures and low flows during the summer months.

The Action Area does not provide suitable habitat for bull trout spawning and rearing (Stephan Charette, ODFW, pers. comm., June 7, 2022). The reach of the river that flows through the City is strictly a migration corridor for adults that exhibit fluvial cohort life histories (Stephan Charette, ODFW, pers. comm., June 7, 2022 and StreamNet 2022). Adult migration through the Action Area typically occurs between March and May when water temperatures and flows are typically supportive of the species' habitat needs. Adults migrate through the Action Area to access higher quality habitat in the upper John Day River headwaters after foraging in lower reaches when habitat conditions are suitable (Stephan Charette, ODFW, pers. comm., June 7, 2022).

5.2.1 Bull Trout Critical Habitat

In 2010, the USFWS issued a Final Rule which designated critical habitat for bull trout (75 FR 63898); the project reach of the John Day River is included in the critical habitat designation for bull trout (USFWS 2022a).

6.0 ENVIRONMENTAL BASELINE CONDITIONS

6.1 John Day River Watershed

The John Day River watershed is in northeastern Oregon in the southern section of the Columbia Plateau Ecological Province. Its approximately 7,918 square mile drainage area is bound by the Columbia River (Lake Umatilla) to the north, the Blue Mountains to the east, the Aldrich Mountains and Strawberry Range to the south, and the Ochoco Mountains to the west. The John Day watershed incorporates portions of Grant, Wheeler, Gilliam, Sherman,

Wasco, Jefferson, Umatilla, Morrow, Crook, Harney, Baker, and Union counties. The largest population centers in the watershed include John Day, Prairie City, and Condon.

The John Day River flows generally northwest for 284 miles from its origin in the Blue Mountains and joins the Columbia River at river mile (RM) 217 upstream from the town of Rufus. The mainstem portion of the John Day River begins in the Strawberry Mountains in the Malheur National Forest and flows west through the City of John Day (RM 247) and then north from Dayville (RM 212). Major rivers flowing into the mainstem are the North Fork, Middle Fork, and South Fork John Day Rivers.

The John Day River watershed is comprised of four major subwatersheds: North Fork John Day, Middle Fork John Day, Upper John Day, and Lower John Day. The project Action Area is in the Upper John Day watershed. The largest tributary to the John Day River is the North Fork, which originates in the Wallowa-Whitman National Forest in the Blue Mountains at elevations near 8,000 feet above mean sea level. The North Fork John Day River flows westerly for 112 miles and joins the mainstem near Kimberly (RM 185), 15 miles downstream of the town of Monument. The Middle Fork John Day River originates south of the North Fork in the Blue Mountains of the Malheur National Forest, flows westerly for 75 miles, and merges with the North Fork about 18 miles upstream of Monument. The South Fork John Day River originates in the southwest portion of the Malheur National Forest and flows 60 miles north until it merges with the mainstem near Dayville.

The John Day River watershed has a continental climate characterized by low winter and high summer temperatures, low average annual precipitation, and dry summers. Climate in the watershed ranges from sub-humid in the upper watershed to semi-arid in the lower watershed. Most precipitation falls between November and March. Less than 10% of the annual precipitation falls as rain during July and August, usually from sporadic thunderstorms (CBMRCD 2005). The upper elevations receive up to 50 inches of precipitation annually, mostly in the form of snow; lower elevations receive 12 inches or less of precipitation (CBMRCD 2005).

The watershed's vegetation ranges from coniferous forest at higher elevations to perennial grassland at middle elevations to desert shrub-steppe at lower elevations. Riparian habitats are often found along the watershed's waterways. Irrigated agriculture is common on the river's floodplain throughout the watershed, and dryland farming is present to varying degrees. Most of the irrigation is from surface waters of the John Day River and its tributaries. Riparian areas are typically managed as part of larger agricultural operations, and many have been altered from their natural state by water diversions, channelization, and vegetation changes (CBMRDC 2005).

Historically, the John Day River was one of the most significant anadromous fish producing rivers in the Columbia River Basin (CRITFC 1995). The John Day River watershed is widely held as home to the strongest native runs of spring chinook salmon and summer steelhead in the Columbia Basin (CRITFC 1995 and ABR, Inc. 2003). The lower reaches of the John Day River are also home to a relic run of fall Chinook salmon (*O. tshawytscha*). In addition, the entire system supports an unknown number of anadromous Pacific lamprey (*Entosphenus tridentatus*).

Changes in the watershed such as elevated water temperatures, decreased flow, and alteration of the hydrograph have in many cases favored introduced [smallmouth bass (*Micropterus dolomieu*), channel catfish (*Ictalurus punctatus)*, and carp (*Cyprinus carpio*)] or non-salmonid species [northern pikeminnow (*Ptychocheilus oregonensis*), chiselmouth (*Acrocheilus alutaceus*), and redside shiner (*Richardsonius balteatus*)] in places that historically were dominated by salmonids (CBMRCD 2005). Introduced species – smallmouth bass and channel catfish in particular – have provided a very popular fishery in areas once occupied by salmonids.

Some past and current land use practices have degraded the quality of habitat that supports native salmonids in the watershed. River channels, particularly along the upper mainstem and South Fork John Day rivers, experienced intensive stream channelization, flow modifications and drainage (including some tiling of drainage ditches) projects between 1943 and 1951 (CBMRCD 2005). These projects were encouraged and supported by various agencies to improve crop production (ODA 2002). Water withdrawals have reduced stream flows, especially during summer, and contributed to higher water temperatures, which collectively can function as seasonal passage barriers for salmonids. Poorly managed grazing, mining, timber harvesting, and maintenance of pushup dams have reduced riparian vegetation and shade, also contributing to higher water temperatures, and reducing habitat diversity (CBMRCD 2005). Riparian road construction and use, agricultural and residential development, and recreational use of riparian areas have also contributed to compromised fish habitat. Properly functioning salmonid habitat is largely restricted to mainstem reaches of the North Fork and headwater tributaries throughout the watershed (Stephan Charette, ODFW, pers. comm., June 7, 2022).

6.2 Conditions within the Action Area

Mason, Bruce & Girard, Inc. (MB&G) staff performed a review of the Action Area on June 3, 2022. MB&G assessed the Action Area for physical and biological habitat characteristics that support ESA-listed fish species and to gain a sense of the Action Area's general environmental character and predominant land uses. The primary Action Area that includes the proposed new WWTF site, new sewer influent pipeline, and existing WWTF occur along the north side of the John Day River in an area that has experienced several past uses that have generally degraded river channel, riparian, and floodplain habitat. This area has historically experienced dredging, mining, and forest product manufacturing for many years. Photographs of the Action Area and surrounding area are provided in Appendix B.

The Action Area is in one of the former epicenters for early 20th century mining and dredging operations in the John Day Valley (Ducote 2020). In 1869, the Action Area was included in a mining claim according to the General Land Office maps (Ducote 2020). During the period of extensive mining, the John Day River channel was realigned several times to provide access to mineral mining areas for dredging activities (Nick Green, City of John Day, pers. comm., June 3, 2022). Dredging involved the use of heavy machinery in attempts to discover gold and other valuable minerals. Much of the dredge tailings generated during this time were placed within the John Day River's north bank in and around the Action Area to support development in the City (Ducote 2020). In the 1930's, the U.S. Army Corps of Engineers shifted the river's channel to its current alignment in the Action Area and placed flood protection measures (*i.e.,* riprap) along its banks.

The Oregon Pine lumber mill and associated facilities were constructed in the early 1930s and were in operation for the following 60 years until the main timber production facilities were closed in the early 1990s (Ducote 2020). The mill and associated lumber processing facilities were located on the south side of the John Day River outside of the Action Area. The mill used the proposed WWTF site within the Action Area for log storage. By 1994, the facility's log ponds on the south side of the river outside of the Action Area were filled, and the site was mostly used for log storage on both sides of the river until the late 1990s. Currently, one remnant lumber building exists just south of the Action Area that is slated for reuse in the City's proposed Oregon Pine/Innovation Gateway Area Plan.

The former lumber mill site was evaluated and remediated of contaminated soils multiple times since 2009. Concerns of the mill site's historical use and signs of potential contamination prompted several investigations and remediation operations. PCBs, diesel, and other soil contaminants were identified through site assessments in 2010 and 2011. Site cleanup took place in 2013 involving the removal of over 51.68 tons of soil from lumber mill site south of the river outside of the Action Area, which resulted in a No Further Action (NFA) letter from DEQ. After the City acquired the property in 2017, they performed on-site Phase I (5/11/2017) and Phase II (1/2/2018) Environmental Site Assessments. These investigations identified small areas of contamination remaining. The City removed and transported an additional 33 tons of soil from the former lumber mill site south of the river outside of the Action Area off-site for disposal. DEQ provided the City with an additional NFA letter in 2018 that determined the remedial action to address environmental contamination at the former Oregon Pine site, which includes the location of the proposed WWTF and its parking lot and driveway, was complete.

The part of the Action Area where the new WWTF will be constructed is composed of cleared land containing mostly grasses and forbs with a small patch of young Ponderosa pines (*Pinus ponderosa*) located on the eastern part of the WWTF footprint. The proposed new sewer pipeline alignment, to be constructed from the existing WWTF headworks to the new WWTF, follows NW 7th Avenue west of the existing WWTF along the north side of the existing WWTF percolation ponds and turns south and then west to reach the new WWTF site. The part of Davis Creek where the new sewer pipeline will be bored under the creek and NW 7th Avenue exhibits degraded channel, bank, and riparian conditions. The creek was dry during MB&G's June 3, 2022, site visit. The pipeline boring work will not encounter or otherwise affect the Davis Creek channel. The existing sewer siphon proposed for rehabilitation is located under and adjacent to the John Day River upstream of the existing WWFT. The structure is accessible from existing manholes on both sides of the river in its riparian zone and the proposed work will not require in-water work or channel impacts below the OHWM of the John Day River. As noted, the two lift stations proposed for upgrades are in paved, developed areas south of the river outside of the floodplain.

Canyon Creek empties into the John Day River from the south directly adjacent to the existing WWTF located on the opposite, north side of the river's floodplain. Canyon Creek typically provides cooler water temperatures than the mainstem of John Day River, which supports juvenile and adult salmonid habitat needs as they migrate through the project area (Stephan Charette, ODFW, pers. comm., June 7, 2022). Removal of the existing WWTF will not involve in-water work and will not affect the John Day River or Canyon Creek given erosion and sediment control measures that will be in place during construction.

6.3 Baseline Conditions of Pathways and Indicators

In *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996), NMFS defines properly functioning condition (PFC) as the sustained presence of natural habitat-forming processes (*e.g.,* bedload transport, channel migration, riparian vegetation succession) that are necessary for the long-term survival and recovery of the species (NMFS 1999). Thus, PFC constitutes habitat-based biological requirements of the species (steelhead for this project): the essential physical features that support spawning, incubation, rearing, feeding, sheltering, migration, and other behaviors. Such features include adequate instream flow, appropriate water temperature, loose gravel for spawning, unimpeded fish passage, deep pools, and abundant large tree trunks and root wads. In addition, potential project effects on bull trout subpopulation characteristics have been considered according to *A Framework to Assist in Making Endangered Species Act*

Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale (USFWS 1998). See Table 9 below for a summary of baseline habitat parameters. Note that the Subpopulation Characteristics section applies only to bull trout per the USFWS document.

Table 9. Checklist for documenting environmental baseline of relevant indicators for the MCR DPS Steelhead (NMFS 1996) and Columbia River DPS Bull Trout in the John Day River Watershed (USFWS 1998).

	Environmental Baseline		
PATHWAYS and INDICATORS	**Properly Functioning**	**At Risk**	**Not Properly Functioning**
Subpopulation Characteristics:*			
Subpopulation size		X	
Growth and Survival		X	
Life History Diversity/Isolation		X	
Persistence and Genetic Integrity		X	
Water Quality:			
Temperature			X
Sediment/Turbidity		X	
Chemical Contam.			X
Habitat Access:			
Physical Barriers		X	
Habitat Elements:			
Substrate		X	
Large Wood			X
Pool Frequency		X	
Pool Quality		X	
Off-Channel Habitat			X
Refugia			X
Channel Condition and Dynamics:			
Width/Depth Ratio		X	
Streambank Cond.			X
Floodplain Connectivity		X	
Flow/Hydrology:			
Peak/Base Flows		X	
Drainage Net. Incr.		X	
Watershed Conditions:			
Road Dens. & Loc.		X	
Disturbance History		X	
Riparian Reserves			X

* Indicators listed under Subpopulation Characteristics were only evaluated for bull trout.
Restore = system-wide beneficial effect.

6.3.1 Subpopulation Characteristics (bull trout only)

Subpopulation Size:

The fragmentation of suitable bull trout habitat and seasonally high water temperatures in the John Day River significantly limit the geographic range and quantity of habitat available to the species. According to ODFW's 2005 Oregon Native Fish Status Report, the John Day River supports 20 bull trout populations, seven of which are located in the North Fork John Day basin, nine in the Middle Fork John Day basin, and four populations in the Upper Mainstem John Day basin (ODFW 2005). Six populations in the John Day basin are considered extinct. Limited data is available regarding the number of individuals that currently exist in the John Day River Mainstem bull trout subpopulation; however, it is reasonable to assume that more than 50 individuals currently exist in the subpopulation. Therefore, the bull trout subpopulation size in the John Day River Mainstem is considered to be **at risk**.

The Action Area is not expected to support bull trout breeding or rearing (Stephan Charette, ODFW, pers. comm., June 7, 2022). Movement of bull trout into the Action Area is only likely during brief periods when water quality conditions in the Action Area are considered adequate to support adult bull trout foraging migration, such as in fall or spring when water temperatures are low. Furthermore, habitat conditions in the Action Area are not considered adequate to maintain bull trout subpopulations. The proposed project is not expected to affect the existing habitat baseline of the Action Area for bull trout given the water quality (*i.e.,* stormwater management) and wastewater effluent standards that are proposed for the project and the lack of in-water work and effects on key bull trout habitat parameters. As such, the proposed project is expected to **maintain** this bull trout population status parameter once implemented.

Growth and Survival:

The current size and distribution of bull trout populations in the John Day River watershed are a fraction of historic populations (ODFW 2005). Habitat degradation has affected river dynamics, water temperatures, sediment characteristics, and riparian and floodplain conditions and has therefore limited bull trout subpopulations to a few locations concentrated in the watershed's headwaters. This has significantly reduced the ability for this species to carry out all its life stages and has significantly affected species growth and survival (**at risk**). Bull trout are expected to only use the Action Area as a migratory corridor when water quality conditions support fluvial bull trout foraging migration. The proposed water quality standards and monitoring requirements associated with the new WWTF DEQ permit and ESA consultation conservation measures are expected to **maintain** this bull trout population parameter.

Life History Diversity/Isolation:

Habitat fragmentation and population isolation are key components to the historic decline of bull trout in the John Day River watershed. Fluvial forms of the species are present, but overall subpopulation geographic isolation and habitat-based passage issues restrict the species' attainment of properly functioning life history and genetic diversity. For these reasons, the species is considered **at risk** in the John Day River watershed. The proposed action is not expected to have an impact on existing bull trout life history diversity and levels of subpopulation isolation in the John Day River watershed given the scope of the action and conservation measures proposed. The project is not expected to affect (will **maintain**) existing baseline conditions with the John Day River or affect bull trout critical habitat.

Persistence and Genetic Integrity:

Habitat degradation and seasonal water quality and flow related passage barriers limit bull trout subpopulation connectivity and result in relatively moderate levels of bull trout genetic heterogeneity in the John Day River watershed. In addition, competing species (*e.g.,* brook trout) have displaced or hybridized with bull trout in the watershed's headwaters (ODFW 2005), which has led to decreases in some subpopulation sizes and genetic integrity (**at risk**). The project is not expected to affect (will **maintain**) existing baseline conditions with the John Day River or affect bull trout critical habitat.

6.3.2 Pathways and Indicators

Given that the potential impacts of the proposed project on baseline habitat conditions for steelhead and bull trout are limited to direct and indirect effects on water quality, peak/base flows, and riparian vegetation, further discussion of baseline habitat conditions is limited to these habitat elements.

6.3.2.1 Water Quality

Water quality varies throughout the John Day River. According to the DEQ's 2012 303d list, the upper John Day River has water quality limiting factors including chlorophyll a, dissolved oxygen, *E. coli*, fecal coliform, nutrients, pH, sedimentation, temperature, and copper (DEQ 2012). High stream flows during winter and spring and streambank erosion contribute to turbidity. Low summer flows in the upper watershed contribute to seasonally elevated water temperatures and eutrophication resulting from agricultural practices results in elevated pH levels; and decreased dissolved oxygen has been documented in the river (CBMRCD 2005). Based on this information, the water quality parameter for the watershed is **not properly functioning**.

6.3.2.2 Peak/Base Flows

Within the watershed, channel/floodplain modifications, extensive irrigation withdrawals, and climate change have resulted in altered peak and base flows. The John Day River is one of the largest undammed rivers in the western U.S. Because of the lack of flow impoundments, moderation of base and peak flows cannot be anthropogenically controlled. This coupled with the aforementioned flow alterations make this parameter **at risk** in the watershed.

6.3.2.3 Riparian Reserves

Riparian conditions within the watershed have been adversely affected by agriculture, development, roads, and streambank armoring and clearing, which alter the passage of wood and sediment and can increase water temperature. As such, many reaches of the John Day River exhibit poor riparian recruitment. The riparian conditions along the John River within the Action area are characterized by a predominantly non-native understory and a thin overstory comprised of native trees of various age classes, with very little native riparian species recruitment. The urban, developed nature of the river within the City and past land uses have limited the development of a stable, fully functioning riparian corridor. As such, the riparian reserves parameter within the watershed is **not properly functioning**.

7.0 ANALYSIS OF EFFECT OF THE ACTION

This section addresses direct, indirect, and interrelated/interdependent effects on listed fish species that may result from implementation of the proposed project given the conservation measures to be employed. In addition, this section describes anticipated cumulative effects from the proposed project that are reasonably certain to

occur within the project action area. Factors considered in the analysis include proximity of the action, distribution, timing, nature of the effect, duration, and disturbance frequency, intensity, and severity. This effects analysis is based on the best scientific and commercial data available concerning the impact of the proposed project on listed fish species and their critical habitat.

Habitat elements potentially affected by the proposed project include water quality, peak/base flows, and riparian reserves. Direct effects include all immediate impacts (adverse and beneficial) from project-related actions. All potential impacts are considered assuming implementation of conservation measures presented in section 4.6.

7.1 Direct Effects

This section addresses potential direct effects of the project on listed fish species and critical habitat elements and whether those effects will maintain existing conditions for the habitat parameter (*i.e.,* **maintain)** or result in temporary, localized change in the habitat parameter (*i.e.,* **maintain**).

7.1.1 Water Quality

7.1.1.1 Temperature

The proposed project is not expected to measurably affect water temperature or riparian shade conditions within the Action Area given the groundwater modeling results for the project and the lack of impacts on riparian vegetation. Groundwater modeling indicated that there is a very low likelihood for the City's groundwater effluent discharge from the proposed WWTF to adversely affect the baseline temperature conditions in the John Day River given the type and location of the proposed subsurface infiltration galleries, the volume of treated wastewater to be infiltrated, and existing baseline groundwater and surface water conditions. Increased water temperatures in the river could result in metabolic and behavioral stressors on any adult or juvenile steelhead or bull trout present in the Action Area and could adversely affect egg and fry survival by limiting river's ability to supply oxygenated water.

While groundwater temperatures near the John Day River in the Action Area may rise from the infiltration of treated effluent into groundwater reserves by up to 0.5-1.5 degrees Celsius (CwM 2021), the potential for increasing surface water temperatures in the John Day River are expected to be negligible due to the conservative assumptions in the modeling and the immediate mixing and dilution of the treated groundwater into the river. To ensure that the modeling assumptions are correctly estimating impacts to the riverine habitat, groundwater temperature will be monitored at locations identified in the groundwater monitoring plan to confirm that the proposed WWTF upgrades do not affect temperature conditions in the John Day River. In summary, the proposed project is expected to **maintain** this habitat parameter.

7.1.1.2 Sediment/Turbidity

The project does not involve in-water work and therefore, is not expected to result in short-term, localized increases in turbidity within the John Day River during construction. BMPs including a project specific ESCP and PCP will be implemented during new WWTF and pipeline construction, siphon rehabilitation, and removal of the existing WWTF to prevent any sediment mobilization from uplands reaching waterways. The proposed WWTF effluent discharge is not expected to result in increased TSS loads to the John Day River based on TSS absorption and settling of TSS in groundwater prior to discharge into the river. In addition, the DEQ permit requires TSS

monitoring and specific TSS thresholds for prior to use of recycled water that is not infiltrated in the subsurface infiltration galleries. The proposed project is expected to **maintain** this habitat parameter.

7.1.1.3 Chemical Contamination

The proposed project could theoretically result in chemical contamination of groundwater and surface water in the John Day River from operation of the new WWTF. Specifically, chemical contamination could result from discharge of treated effluent into infiltration galleries; however, the proposed project will not alter the existing flow path of the underlying aquifer and groundwater or measurably change the volume of groundwater that moves through the aquifer. Chemical contamination could occur from an unexpected release of influent to the river during siphon rehabilitation and from any vehicles or heavy equipment operating, stored, or refueled when in proximity to waterways by releasing small amounts of fluids, petroleum, and oil. In addition, inadvertent exposure and upland release of contaminants could occur during new influent pipeline and WWTF construction if this work encounters previously undiscovered soil contamination. The effects of these potential chemical contamination pathways on steelhead and bull trout are discussed below.

The proposed WWTF has been designed per current federal and DEQ water quality standards for wastewater treatment facility effluent. Groundwater modeling concluded that transformation of nitrate via denitrification in the local aquifer will change the nature of the pollutant and thermal diffusion through aquifer material based on the size, location, and configuration of the subsurface infiltration gallery. Dilution and dispersion of any remaining chemical contaminants in the treated effluent will occur in the groundwater aquifer. Adsorption and other biological processes are expected to further reduce and transform any small amount of wastewater pollutants that remain in the treated effluent through groundwater processing. Transformation of the treated effluent to background or below background concentrations in the John Day River is anticipated with the proposed groundwater infiltration system. This secondary level of treatment coupled with primary treatment at the WWTF is expected to maintain the existing chemical contamination baseline within the John Day River. While the proposed WWTF will improve metal removal from wastewater compared to the existing WWTF, metals may persist in treated wastewater discharged from the new WWTF that are at low enough levels to comply with DEQ permit requirements, but at high enough levels to result in sub-lethal or lethal effects on steelhead and/or bull trout given the low metal concentrations that have been shown to affect salmonids. Metals have been shown to affect coho salmon (*O. kisutch*) olfactory and navigation abilities at very low levels, resulting in spawning migration disruptions, predation vulnerability, and in some cases, direct mortality (McIntyre et al. 2021). Preliminary evidence indicates an uneven metal exposure vulnerability across all salmonid species, and a need to further investigate sublethal toxicity from metals on steelhead and Chinook salmon (*O. tshawytscha*). For example, McIntyre et al. (2018) indicate that chum salmon (*O. keta*) do not experience the lethal response to metals observed in coho salmon (NOAA 2022b). As such, this analysis conservatively assumes that metals may persist after wastewater processing by the proposed WWTF, and these metals may be released to the John Day River from groundwater exchange resulting in sublethal or lethal effects on steelhead and/or bull trout.

As noted, the project site has undergone several investigations and remedial activities to remove contaminated soil from past land uses. These remedial activities have resulted in the removal of 81 tons of contaminated soil from the Action Area and notification from DEQ that remedial activities were complete and consistent with DEQ remediation requirements. Despite the City's extensive remediation efforts and coordination with DEQ, it cannot completely be ruled out that no additional soil contamination exists within the Action Area. Construction of the

proposed WWTF will include contract specifications that require removal of contaminated soils to a DEQ-approved location if such soils are encountered per the conservation measures included in this BA. Infiltration of treated wastewater has a low probability of encountering contaminated soils based on past site remediation measures conducted by the City for the project site. However, the potential exists for the treated wastewater to encounter areas of unknown contamination as it moves through the groundwater aquifer. If contaminated soils leach pollutants into groundwater, adverse behavioral or physiological effects on steelhead and/or bull trout could occur if the contaminants are in high enough concentrations to inflict a sublethal or lethal effect on these species when and where groundwater is mixed with surface waters in the river. Given this uncertainty, groundwater and surface water monitoring associated with the City's WWTF DEQ permit and ESA consultation with NMFS and USFWS should determine if the infiltrated effluent is experiencing contamination as it moves through the underground aquifer. If contamination is detected, the City will undergo appropriate countermeasures to address the contamination.

Rehabilitation of the sewer siphon adjacent to and under the John Day River will be initiated by scoping the interior of the siphon with a specialized camera to assess the condition of the siphon and guide the rehabilitation of the structure. The trenchless, slip-lining effort within the siphon will be conducted from manholes near the river channel, but in upland areas. As such, the proposed rehabilitation of the siphon is not expected to result in short-term or long-term changes to the river's baseline condition for chemical contamination.

The new WWTF includes a stormwater management system that will treat and detain stormwater runoff from all contributing impervious surfaces associated with the proposed project (*i.e.,* the new WWTF, WWTF parking lot and driveway, and portions of 7th street discussed earlier in this BA) by infiltrating 100% of the contributing runoff from the full 100-year storm event. As such, the project is not expected to result in pollutant loading in the John Day River from constructing new impervious surfaces and associated stormwater runoff. The proposed WWTF site has never been flooded.

While reuse of treated wastewater for irrigating City-owned properties is expected to potentially result in water conservation, the use could result in the runoff of fertilizers and other nutrients present on these properties into local groundwater reserves. However, the proposed change in irrigation water sourcing is not expected to alter the chemical contamination baseline of the John Day River given that these areas are currently already irrigated, and the volume of water used for irrigation is not expected to change from current operations.

During construction, exposure and release of previously undiscovered upland soil contaminants could occur and equipment and vehicles operating near the John Day River and Davis Creek represent potential sources of chemical contamination. Accidental spills of construction materials or petroleum products could have adverse effects to water quality if spills occur in proper proximity to the water bodies. Development and implementation of a PCP, which will include containment measures for construction-related chemical hazards, will significantly reduce the likelihood of chemical releases within the Action Area. The proposed project is expected to **maintain** this habitat parameter. In addition, project construction will be carried out with conservation measures and contingencies in place to quickly identify, contain, remove, and dispose of any contaminated media that is encountered during earthwork as noted in section 4.6 of this BA.

7.1.2 Peak/Base Flows

The proposed project does not involve an increase in groundwater and surface water withdrawals from the existing City's municipal water supply. Rather, the project includes water conservation measures that are expected to avoid effects on the John Day River's existing peak and base flow baseline conditions. The use of subsurface infiltration galleries is expected to avoid the loss of treated wastewater from evaporation and biological uptake that currently occurs in the existing WWTF's percolation ponds. As noted, the City proposes to reuse some of the non-potable treated wastewater generated from the new WWTF for irrigation uses on City properties as part of the proposed project. This measure will minimize the use of water supplied by the City's water right on Long Gulch Springs for irrigation and result in water reuse efficiencies that the current WWTF system does not provide. Because treated wastewater will be infiltrated into the groundwater environment that eventually discharges into the river downstream of the new WWTF location, the treated water will be kept within the same groundwater basin that it is drawn from. In addition, the new WWTF includes a stormwater management system that collects, treats, detains, and releases stormwater generated from the new WWTF, WWTF driveway and parking lot, and portions of 7th street in a manner that will not affect the river's hydrograph or peak/base flows. As such, the proposed project is expected to **maintain** this habitat parameter.

7.1.3 Riparian Reserves

The project will not require removing riparian vegetation or increasing existing disturbances in the river's riparian corridor. As such, the City does not anticipate any adverse impacts on bank stability, riparian habitat/shade, or channel temperatures, and this habitat parameter will be **maintained**.

7.2 Effects to Bull Trout Critical Habitat Primary Constituent Elements

The USFWS has specified several physical, chemical, and biological parameters which it believes are essential for the recovery of CR bull trout. These elements constitute the Primary Constituent Elements (PCEs) as defined in the revised Critical Habitat designation for the Columbia River Bull Trout DPS (75 FR 63898)[1].

7.2.1 Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia

The proposed project has been developed to avoid adverse impacts to groundwater resources and hyporheic flows. Proposed primary and secondary treatment coupled with absorption, biological processing, dilution, and dispersion of wastewater in the alluvial aquifer is expected to ensure maintenance of existing groundwater and surface water quality conditions in the Action Area. The project includes stormwater management of new impervious surfaces that will involve treatment and detention of stormwater generated from the new WWTF in a manner that does not affect the water quality and quantity baseline of the river. The project is expected to conserve ground and surface water resources by changing wastewater discharge from percolation ponds to subsurface infiltration galleries and reuse treated wastewater for irrigation of City properties. The project is not expected to result in changes to the existing baseline temperature or peak/base flow conditions in the John Day

[1] In 2016, NMFS and USFWS revised its regulations for designating critical habitat and removed the term "primary constituent elements" from the regulations. However, the Services have indicated that nothing in the final revised regulations was intended to require that any previously designated critical habitat be reevaluated. The Services revised the regulations by replacing "primary constituent elements" with "physical or biological features" as used in the ESA to eliminate redundancy without changing the manner in which critical habitat is designated.

River and bull trout critical habitat given the scope of the project and conservation measures proposed. While it cannot be ruled out that low levels of chemical contamination could occur within the Action Area as a result of the proposed action from treated wastewater moving through areas of unknown, underground contamination that could be passed through the groundwater aquifer to surface waters, the likelihood of this occurring is low based on past contamination remediation measures and the analysis completed for this BA. Groundwater and surface water monitoring is proposed to detect potential changes to the existing water quality baseline resulting from the proposed project and determine potential adjustments to the proposed WWTF system to address contamination if it is detected. Bull trout are not expected to use the reach of the John Day River within the City outside of sporadic foraging by fluvial adults when water quality and flow conditions provide suitable habitat conditions for the species.

7.2.2 Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

The proposed project does not include any physical barriers to fish migration. The proposed new WWTF is not expected to affect water quality or quantity within the John Day River based on the treatment processes proposed that address wastewater pollutants of concern including pH, temperature, pathogens, nutrients, organic matter, inorganics, and DSS/TSS, and water conservation measures proposed. Proposed wastewater treatment measures combined with the proposed stormwater management approach for treating and detaining stormwater from the new WWTF are expected to maintain existing water quality and quantity conditions within the Action Area and not present a biological- or water quality-based fish passage barrier.

7.2.3 Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

The project will not require removal of riparian vegetation that shades and provides temperature regulation of the John Day River. Also, the project's use of direct infiltration of treated wastewater into subsurface infiltration galleries is not expected to result in changes to the river's existing temperature baseline. The proposed direct infiltration of treated wastewater and water reuse measures are expected to conserve the city's ground and surface water resources. While groundwater temperatures near the John Day River in the Action Area may rise from the infiltration of treated effluent into groundwater reserves by up to 0.5-1.5 degrees, Celsius, the potential for increasing surface water temperatures in the John Day River are expected to be negligible due to noted limitations in the groundwater modeling conducted for the project (CwM 2002). As such, the project is not likely to affect existing water temperature conditions in the John Day River or in bull trout critical habitat.

7.2.4 Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.

The proposed project does not involve impacts to the John Day River channel or its riparian zone. The reach of the John Day River that flows through the City is heavily riprapped and channelized with limited bull trout habitat refugia. The river segment within the City did not contain large wood, side channels, pools, undercut banks, or

unembedded substrates during the June 3, 2022 site visit. The proposed project will not affect the existing shoreline aquatic environment or channel characteristics.

7.2.5 In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.

Bull trout spawning and rearing habitats occur in the headwater areas of the mainstem John Day River system, upstream of the Action Area (Stephan Charette, ODFW, pers. comm., June 7, 2022). The species is not expected to spawn in the Action Area. Construction and operation of the new WWTF does not involve in-stream work or riparian impacts that could affect existing substrate composition or levels of embeddedness in the Action Area should bull trout spawning and/or rearing occur in the Action Area in the future.

7.2.6 A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.

The proposed project will not affect the John Day River's existing hydrograph, including peak, high, low, or base flows. The project does not involve an increase in ground or surface water withdrawals and includes water conservation measures including direct infiltration of treated wastewater into the groundwater aquifer rather than the existing discharge of treated wastewater into percolation ponds where evaporation and biological uptake remove water from the use and processing cycle. The project also involves some reuse of treated wastewater for irrigation of some of the City's property rather than solely using surface water drawn from Long Gulch Springs for the City's irrigation needs.

7.2.7 Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

The proposed new WWTF is not expected to affect water quality within the John Day River based on the wastewater treatment processes proposed. Proposed treatment measures combined with groundwater infiltration of treated wastewater are not expected to affect the existing water quality or quantity baseline of the John Day River in the Action Area. Separately, the project includes stormwater management of new impervious surfaces that will manage stormwater generated from the new WWTF in a manner that does not affect the water quality and quantity baseline of the river. While the proposed WWTF will improve metals removal from wastewater compared to the existing WWTF, metals may persist in treated wastewater discharged from the new WWTF that results in sub-lethal or lethal effects on steelhead and/or bull trout given these species' susceptibility to very low levels of metal concentrations.

7.2.8 An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

The project does not involve removal of riparian vegetation or other actions that would locally or regionally affect the food base for bull trout. While the project could result in a release of metals or other contaminants into the John Day River, through treated effluent discharge to groundwater and groundwater mixing with surface waters, the likelihood that any metals released from the proposed project resulting in a decrease in bull trout food base from existing baseline food base conditions is expected to be negligible due to proposed water quality

improvements associated with the proposed WWTF, project conservation measures, and existing food base conditions within the Action Area. The project is not expected to affect the availability or abundance of the food base for bull trout of other fish species.

7.2.9 Sufficiently low levels of occurrence of non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

The project will not affect the viability or population dynamics of any non-native predatory or competing fish in the Action Area.

7.3 Indirect Effects

The proposed action will not result in-water work or facilitate additional development. A potential indirect effect common to construction projects is the introduction of invasive vegetation species through soil disturbance that facilitates their recruitment. Although there is potentially an indirect effect of new invasive vegetation species after ground-disturbing actions, the proposed use of weed-free straw and site restoration measures will reduce the probability of invasive species recruitment and increase the number of native species within the Action Area. Also, the construction contractor's specifications will include provisions for washing equipment and treads, storing fuel and chemicals away from waters resources, and other pollution prevention provisions. In addition, reuse of treated wastewater for irrigation of City properties may result in fertilizer and/or nutrients leaching into the into groundwater as the irrigation water infiltrates pervious terrain. However, the proposed change in irrigation water sourcing is not expected to result in adverse indirect effects on steelhead and/or bull trout given that these areas are currently already irrigated, and the volume of water used for irrigation is not anticipated to change from current operations.

7.4 Interrelated and Interdependent Actions

Interrelated actions are part of a larger action and depend on the larger action for justification. Interdependent actions are defined as actions with no independent utility apart from the proposed action. The proposed project is needed to upgrade the City's existing, outdated wastewater treatment system infrastructure and to align with current federal and DEQ environmental standards and is not part of any other larger action or development.

As previously noted, proposed WWTF improvements have been designed to accommodate projected population growth in the City for the next 20 years. This growth projection is based on the City's Comprehensive Plan that was adopted 2019, and includes long-range planning associated with specific elements of the City's Innovation Gateway Area Plan. Elements of the City's Innovation Gateway Area Plan that are planned for future implementation once funding is available and are interrelated with the proposed project include:

1) Completing construction of the remaining 7th Street corridor through the existing WWTF location to connect the City's planned industrial park, the 7th Street Park, and other Innovation Gateway elements to the City's transportation infrastructure.
2) Creating a reclaimed water lake and habitat restoration activities on the south side of the John Day River (in the former log pond area subject to seasonal flooding).
3) Transition of nine existing water rights to instream use for properties purchased by the City as part of

the Innovation Gateway Area Plan.

7.5 Cumulative Effects

Cumulative effects are defined as all "non-federal" actions (*i.e.,* state, local, private, and tribal) reasonably certain to occur in the foreseeable future. There are no anticipated cumulative effects due to the proposed project. The City will continue to implement actions associated with the 2019 Comprehensive Plan and Innovation Gateway Area Plan in the project area as funding is made available. These actions generally involve park, recreation, and multi-modal improvements in and immediately adjacent to the Action Area. The City proposes to establish a bike/pedestrian trail through the former Oregon Pine site once funding is available. There are no other current or future non-federal actions proposed to occur in or near the project Action Area at this time. Any further development or other actions that could affect ESA-listed species in or near the Action Area or any other action proposed by the City that may affect these species and their critical habitats will be reviewed and regulated as applicable by the ODFW, NMFS, and USFWS.

8.0 FINDING OF EFFECT

8.1 Middle Columbia River Steelhead

Evaluation of the potential effects of the proposed action concludes that the project elements described for the City of John Day Wastewater Treatment System Improvements Project is likely to adversely affect MCR steelhead due to the scope of proposed construction activities, proposed stormwater management, and water use and wastewater treatment and discharge measures proposed by the City and detailed in the BA. While the project is not expected to "hinder the attainment of relevant functioning indicators" as defined in *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996), treated wastewater effluent from the proposed WWTF may contain trace amounts of metals that could adversely affect MCR steelhead by impairing the species behaviorally and physiologically. In addition, the infiltrated, treated wastewater could encounter residual contamination residues residing in Action Area soils that were not detected and removed during past contamination remediation efforts, resulting in the potential transport of these contaminants to the John Day River and potentially causing sub-lethal effects on steelhead by impairing respiratory, olfactory, metabolic, and/or reproduction functions or resulting in direct lethal effects and mortality. Therefore, we make a determination of **"likely to adversely affect"** with regard to the MCR steelhead.

8.1.1 Designated Critical Habitat

The John Day River is designated Critical Habitat for MCR Steelhead, and the proposed project does not involve in-water work or other physical alterations to steelhead Critical Habitat. Project construction will not necessitate the removal of riparian vegetation. The proposed WWTF has been designed to treat and release wastewater in a manner that does not affect the existing environmental baseline of the John Day River based on DEQ requirements, the location of the new WWTF, proposed primary and secondary treatment approaches, and water conservation measures proposed. All new impervious surfaces associated with the new WWTF will be treated and detained per current HUD stormwater treatment requirements for avoiding impacts on salmonid habitat. As such, the project **"will not adversely modify" designated critical habitat of the MCR Steelhead DPS.**

8.2 Columbia River Bull Trout

The project Action Area is along a reach of the John Day River that rarely contains bull trout; this is primarily due to elevated temperatures and the lack of bull trout spawning and rearing habitat. The project will not necessitate in-water isolation, disturbance of the river's bank and bed, or fish handling in the John Day River. While the project will not affect the bull trout subpopulation characteristics as defined in *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* (USFWS 1998), wastewater treatment effluent from the proposed WWTF may contain trace amounts of metals that could adversely affect bull trout by impairing the species behaviorally and/or physiologically. In addition, the infiltrated, treated wastewater could encounter residual contamination residues residing in Action Area soils that were not detected and removed during past contamination remediation efforts, resulting in the potential transport of these contaminants to the John Day River and potentially causing sub-lethal effects on bull trout by impairing respiratory, olfactory, metabolic, and/or reproduction functions or resulting in direct lethal effects and mortality. Therefore, we make a determination of **"likely to adversely affect"** with regard to bull trout**.**

8.2.1 Designated Critical Habitat

The John Day River is designated critical habitat for bull trout; however, the project does not include any changes to the existing habitat or channel characteristics within the Action Area. Specifically, the project will not affect any of the PCEs listed in Section 7.2. As such, the project **"will not adversely modify" designated critical habitat for bull trout.**

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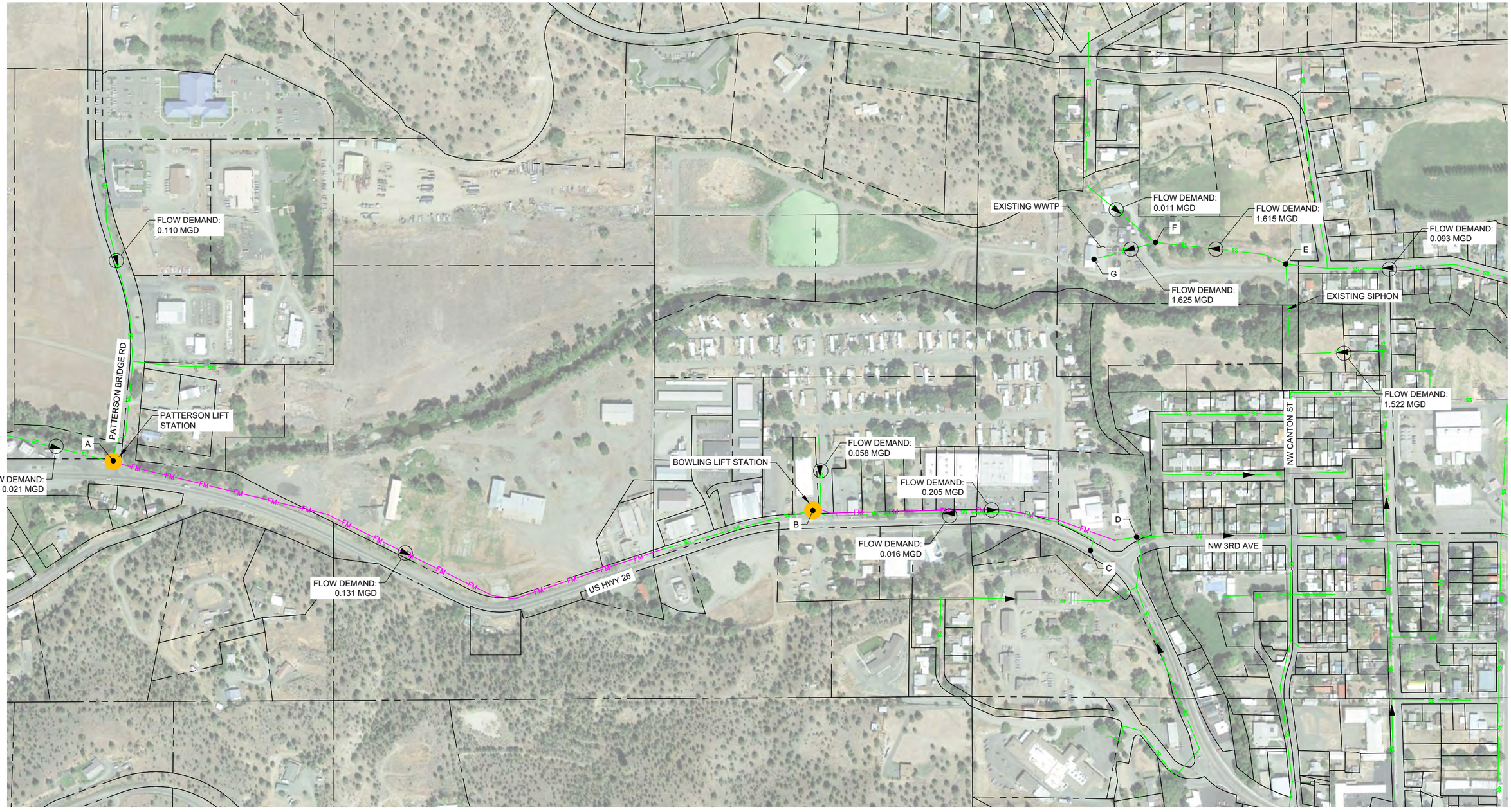
APPENDIX A

Project Plan Sheets and Stormwater Management Plan

City of John Day Wastewater Treatment System Improvements Project

John Day, Oregon



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DISCLAIMER

THIS DRAWING IS INTENDED TO BE PLOTTED IN COLOR ON AN 22" X 34" SHEET. ADJUST SCALES ACCORDINGLY AND VERIFY COLOR LEGEND BELOW IS CORRECT:

RED BLUE

NO.	DATE	BY	APPR	REVISIONS

FLAGLINE ENGINEERING
BEND OFFICE
686 NW YORK DR, #100
BEND, OR 97703
541.797.6781

DESIGNED BY: VRO
DRAWN BY: KJB
CHECKED BY: JDP
DATE: FEBRUARY 2021
PROJECT NO: TBD
SCALE: AS NOTED

WASTEWATER TREATMENT PLANT
JOHN DAY

EXISTING FLOW CONDITIONS

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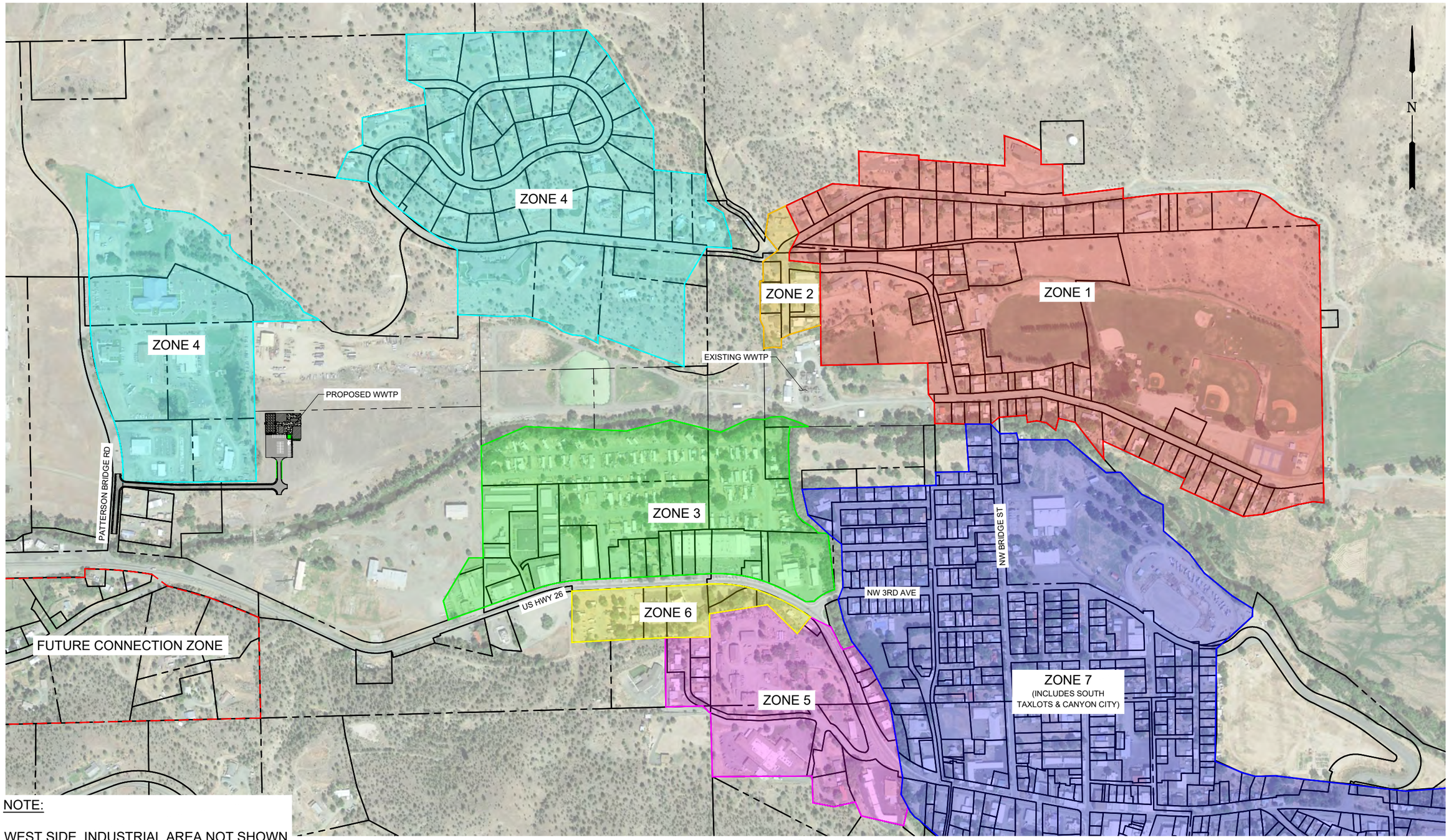

NOTE:

WEST SIDE INDUSTRIAL AREA NOT SHOWN

OVERVIEW
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PRELIMINARY

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DISCLAIMER

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DESIGNED BY: VRO
DRAWN BY: KJB
CHECKED BY: JDP
DATE: JANUARY 2021
PROJECT NO: TBD
SCALE: AS NOTED

WASTEWATER TREATMENT PLANT
JOHN DAY

TAXLOT ZONES

DRAWING NO. C1.0
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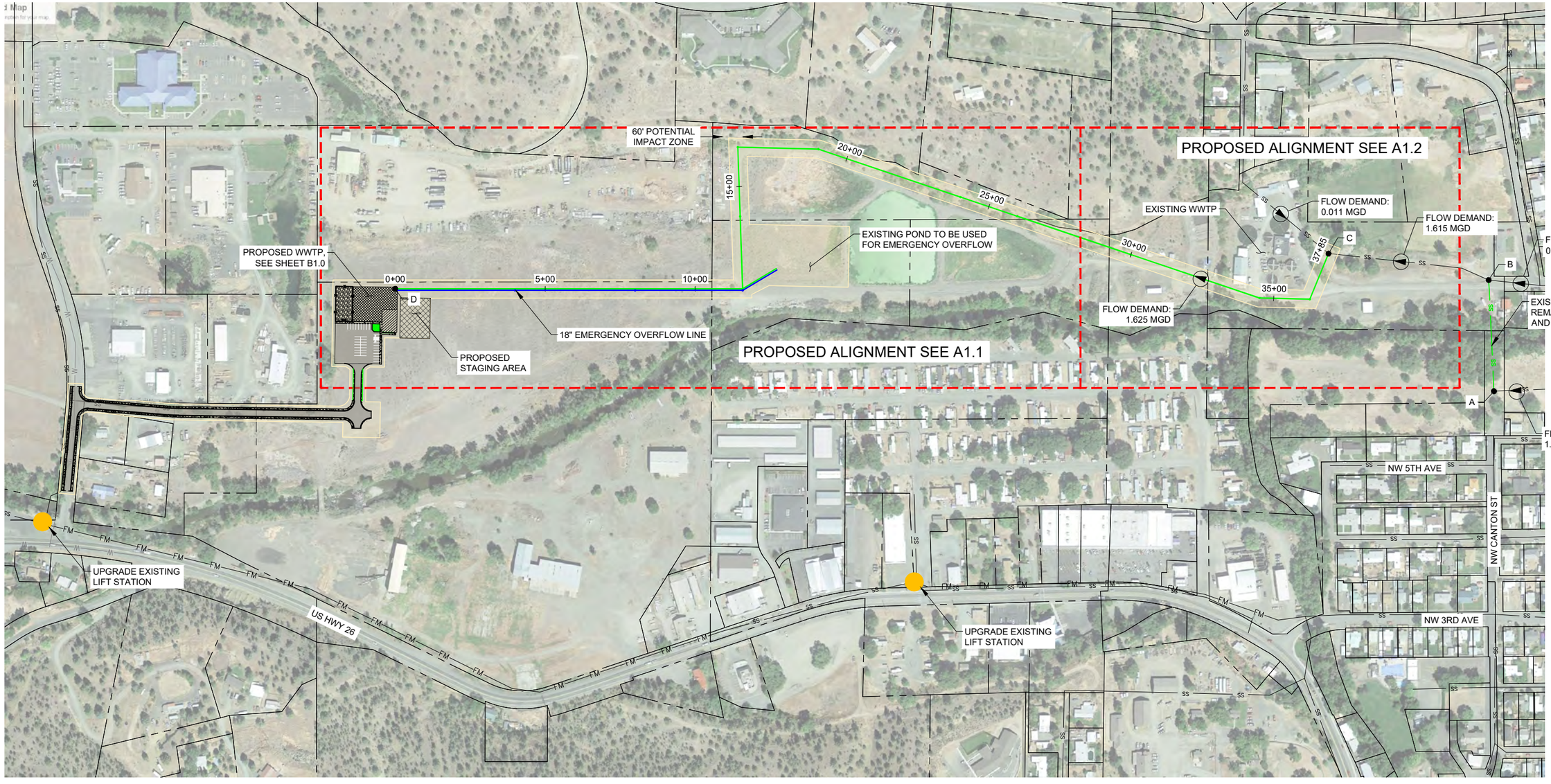

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PRELIMINARY

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SCALE: 1"=175'

DISCLAIMER

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RED BLUE

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FLAGLINE ENGINEERING
BEND OFFICE
686 NW YORK DR, #100
BEND, OR 97703
541.797.6781

DESIGNED BY:	DRAWN BY:	CHECKED BY:
VRO	KJB	JDP

DATE:	PROJECT NO:	SCALE:
FEBRUARY 2021	TBD	AS NOTED

WASTEWATER TREATMENT PLANT
JOHN DAY

ALTERNATIVE 1
OVERVIEW

DRAWING NO.
A1.0

SHEET NO.
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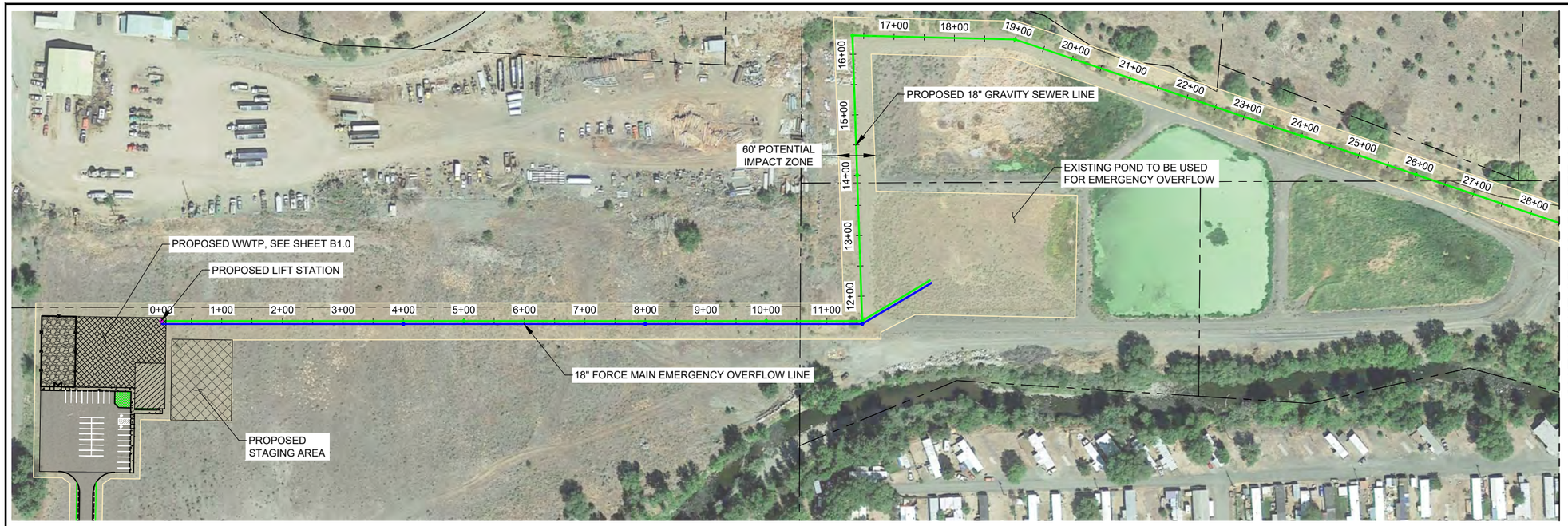

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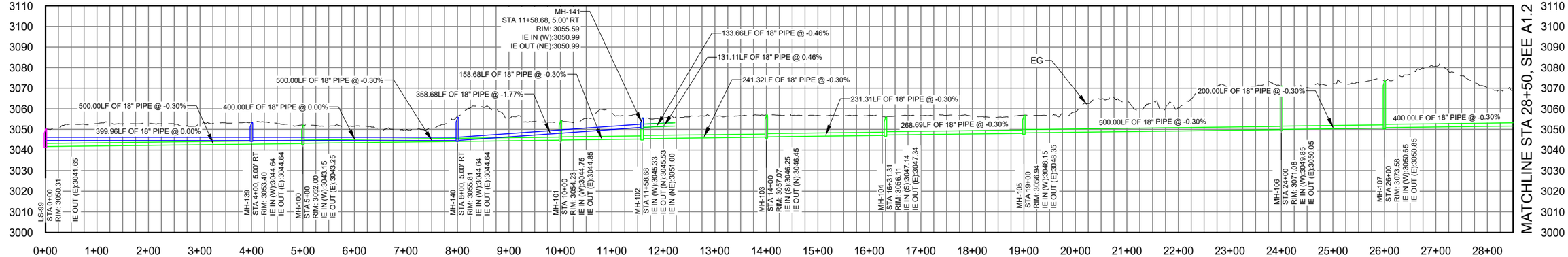

PROFILE
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1" = 25' VERT.

2
A1.1

PRELIMINARY

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SCALE OF FEET
SCALE: 1"=100'

DISCLAIMER

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NO.	DATE	BY	APPR	REVISIONS

FLAGLINE ENGINEERING
BEND OFFICE
686 NW YORK DR, #100
BEND, OR 97703
541.797.6781

DESIGNED BY:	DRAWN BY:	CHECKED BY:
VRO	KJB	JDP

DATE:	PROJECT NO:	SCALE:
FEBRUARY 2021	TBD	AS NOTED

WASTEWATER TREATMENT PLANT
JOHN DAY

ALTERNATIVE 1
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DRAWING NO. A1.1

SHEET NO. 1

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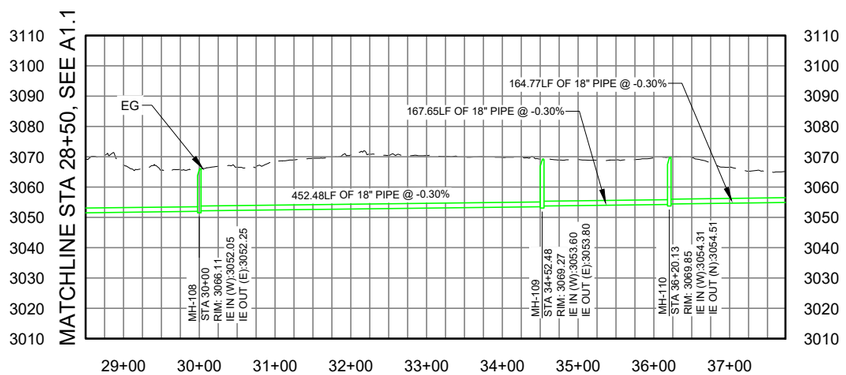
PLAN
SCALE: 1" = 100'

1
A1.2



PROFILE
SCALE: 1" = 100' HORIZ.
1" = 25' VERT.

2
A1.2

C:\Users\voldh\Flagline Dropbox\Flagline\Projects\John Day\WWTP\CAD\Working_XrefPBASE_ALT1.dwg

PRELIMINARY

100 0 100 200
SCALE OF FEET
SCALE: 1"=100'

DISCLAIMER

THIS DRAWING IS INTENDED TO BE PLOTTED IN COLOR ON AN 22" X 34" SHEET. ADJUST SCALES ACCORDINGLY AND VERIFY COLOR LEGEND BELOW IS CORRECT:
RED BLUE

NO.	DATE	BY	APPR	REVISIONS

FLAGLINE ENGINEERING
BEND OFFICE
686 NW YORK DR, #100
BEND, OR 97703
541.797.6781

DESIGNED BY: VRO
DRAWN BY: KJB
CHECKED BY: JDP
DATE: JANUARY 2021
PROJECT NO: TBD
SCALE: AS NOTED

WASTEWATER TREATMENT PLANT
JOHN DAY

ALTERNATIVE 1
STA 28+50 TO STA 37+84.92

DRAWING NO. A1.2
SHEET NO. 2

STORMWATER INFORMATION FORM

HUD PROGRAMMATIC OPINION

If you are submitting a project that includes a stormwater plan for review, please fill out the following cover sheet ***to be included with*** any stormwater management plan and any other supporting materials. Please have the project engineer provide their signed stamp in the box to the right. Submit this form with the Action Implementation Form to NMFS at *HUDBiOp.wcr@noaa.gov.*

PROJECT INFORMATION	NMFS PROJECT TRACKING #: WCR-____-____
PROJECT NAME John Day Wastewater Trt. Facility	COUNTY GRANT
PROJECT STREET ADDRESS	
TYPE OF PROJECT (select all that apply)	☐ REDEVELOPMENT ☐ RESIDENTIAL ☐ INSTITUTIONAL ☐ NEW DEVELOPMENT ☐ COMMERCIAL ☐ OTHER
HAVE YOU CONTACTED ANYONE AT NMFS	☒ YES ☐ NO If Yes, Whom: Rebecca Viray
NEAREST RECEIVING WATER OCCUPIED BY ESA-LISTED SPECIES OR DESIGNATED CRITICAL HABITAT John Day River	
STORMWATER DESIGNER / ENGINEER CONTACT INFORMATION	NAME Josef K Hitz
AFFILIATION/FIRM Sisul Engineering	PHONE 541-575-3777 EMAIL jkhitz@sisulengineering.com

SUMMARY OF DESIGN ELEMENTS

1	DESIGN STORMS	2-YEAR, 24-HOUR STORM [Consult: http://www.nws.noaa.gov/ohd/hdsc/noaaatlas2.htm]	1.8 INCHES ____ IN/HR
		WATER QUALITY DESIGN STORM (50% OF 2-YEAR, 24-HOUR STORM) [Except climate regions 4 & 9 (67%) and climate region 5 (75%)]	0.9 INCHES
		WATER QUANTITY DESIGN STORM (10-YEAR, 24-HOUR STORM) [Consult: http://www.wrcc.dri.edu/pcpnfreq/or10y24.gif]	2.0 INCHES
		HYDROMODIFICATION DESIGN STORM (% BASED ON 2-YEAR, 24-HOUR STORM) [Western region (42%); Eastern Cascade (56%); SE, NE, North Central (48%)]	1.0 INCHES
2	SITE CHARACTERISTICS	TOTAL PROJECT AREA (Drainage collected 4.36Ac) Project	3.83 ACRES ____ FT²
		EXISTING IMPERVIOUS SURFACE AREA	0.09 ACRES ____ FT²
		PROPOSED TOTAL IMPERVIOUS SURFACE AREA	2.28 ACRES ____ FT²
		PROPOSED LANDSCAPE AREA	1.55 ACRES ____ FT²
		TOTAL AREA OF GROUND DISTURBANCE 3.83	☐ ☐ ____ ACRES ____ FT²
		WILL IMPERVIOUS AREA BE REDUCED FROM CURRENT CONDITIONS? IF YES, BY HOW MUCH?	☐ YES ☒ NO ____ ACRES ____ FT²
		IS THE SITE CONTAMINATED?	☐ YES ☒ NO
3	DESIGN BASIS	STORMWATER DESIGN MANUAL USED, INCLUDING YEAR/VERSION Central Oregon Stormwater Manual (COSM)	
		DESCRIBE WHICH ELEMENTS OF YOUR STORMWATER PLAN CAME FROM THIS MANUAL Storm calculation methods, design values, some LID methods	

WATER QUALITY INFORMATION

4 ARE LOW IMPACT DEVELOPMENT (LID) METHODS INCORPORATED INTO DESIGN? ☒ YES ☐ NO
HOW MUCH OF TOTAL STORMWATER IS TREATED USING LID? 100 % FT³

5 SPECIFIC LID WATER QUALITY TREATMENT ELEMENTS INCORPORATED

SITE DESIGN ELEMENTS	TREATMENT METHODS
☒ SITE LAYOUT	☒ WATER QUALITY SWALE
☐ CLUSTERED DEVELOPMENT	☐ VEGETATED FILTER STRIPS
☐ DE-PAVE EXISTING PAVEMENT	☐ VEGETATED ROOF
☐ CONSERVE SOILS W/ BEST DRAINAGE	☐ INFILTRATION RAIN GARDEN / LID SWALE
☐ TREE PROTECTION	☐ INFILTRATION STORMWATER PLANTERS
☐ CONSTRUCTION SEQUENCING	☐ SOAKAGE TRENCH
☐ REFORESTATION/TREE PLANTING	☐ DRYWELL
☐ RESTORED SOILS	☐ LINED RAIN GARDEN/LID SWALE
☐ POROUS PAVEMENT	☐ LINED STORMWATER PLANTER

OTHER LID WATER QUALITY TREATMENT METHODS
☒ NAME XERISCAPE AREA/SWALE SOURCE COSM
☐ NAME _____ SOURCE _____
☐ NAME _____ SOURCE _____

6 TREATMENT TRAIN, INCLUDING PRETREATMENT AND LID BMPS USED TO TREAT WATER QUALITY
COLLECTION CATCHBASINS W/ SUMPS & OIL/GREASE SEPERATORS, XERISCAPE INFILTRATION AREA/SWALES, MINIMUM STREET WIDTH
WHY THIS TREATMENT TRAIN WAS CHOSEN FOR THE PROJECT SITE
DRY CLIMATE, LOW MAINTENANCE, HIGH INFILTRATION RATE
NO DISCHARGE AT ALL TO RIVER
PAGE IN STORMWATER PLAN WHERE MORE DETAILS CAN BE FOUND SECTION 3 (COSM)

7 STORMWATER TREATMENT REQUIRED — VOLUME 5726 FT³ — PEAK DISCHARGE 0.45 CFS — AREA TREATED 189921 FT²
IS THE WATER QUALITY DESIGN STORM FULLY TREATED? VOLUME ☒ YES ☐ NO — PEAK DISCHARGE ☐ YES ☐ NO
IF NO, WHY NOT? HOW WILL YOU OFFSET THE EFFECTS FROM UNTREATED STORMWATER? NONE

WATER QUANTITY INFORMATION

8 DOES THE PROJECT DISCHARGE DIRECTLY INTO A MAJOR WATER BODY? ☐ YES ☒ NO

9

PRE-DEVELOPMENT RUNOFF RATE AND VOLUME	WATER QUALITY DESIGN STORM (50% OF 2-YEAR, 24-HOUR)	N/A	CFS	FT³
	WATER QUANTITY DESIGN STORM (10-YEAR 24-HOUR)		CFS	FT³
POST-DEVELOPMENT RUNOFF RATE AND VOLUME	WATER QUALITY DESIGN STORM (50% OF 2-YEAR, 24-HOUR)	0.00	CFS	FT³
	WATER QUANTITY DESIGN STORM (10-YEAR 24-HOUR)	0.00	CFS	FT³

** POST-DEVELOPMENT RUNOFF RATE MUST BE LESS THAN OR EQUAL TO PRE-DEVELOPMENT RUNOFF RATE **

10 METHODS USED TO LIMIT STORMWATER DISCHARGE FROM PROJECT
ON SITE INFILTRATION
PAGE IN STORMWATER PLAN WHERE MORE DETAILS CAN BE FOUND CMCS Pg 16-23

WATER QUANTITY INFORMATION (CONTINUED)

11 SPECIFIC LID DISCHARGE REDUCTION ELEMENTS INCORPORATED

MANAGEMENT METHODS

- ☐ POROUS PAVEMENT
- ☐ SOAKAGE TRENCH
- ☒ INFILTRATION RAIN GARDEN / LID SWALE
- ☐ LINED RAINGARDEN/LID SWALE
- ☐ LINED STORMWATER PLANTER
- ☐ INFILTRATION STORMWATER PLANTERS
- ☐ DRYWELL
- ☐ DOWNSPOUT DISCONNECTION

OTHER LID WATER QUANTITY TREATMENT ELEMENTS

- ☐ NAME _____ SOURCE _____
- ☐ NAME _____ SOURCE _____

12 ARE BOTH WATER QUANTITY DESIGN STORMS FULLY MANAGED (I.E. ATTENUATED)? VOLUME ☒ YES ☐ NO PEAK DISCHARGE ☐ YES ☐ NO

IF NO, WHY NOT? HOW WILL YOU OFFSET THE EFFECTS FROM UNMANAGED STORMWATER?

HYDROMODIFICATION INFORMATION

13 DOES THE PROJECT DISCHARGE DIRECTLY INTO A MAJOR WATER BODY? ☐ YES ☒ NO
[Mainstem Columbia River, Willamette River downstream of Eugene, large lakes, reservoir, ocean, or estuary] IF YES, SKIP STEP 14

14 IS THE POST-DEVELOPED PEAK DISCHARGE >0.5 CFS DURING THE 2-YEAR, 24-HOUR STORM EVENT? ☐ YES ☒ NO

IF YES, FLOW CONTROL MANAGEMENT REQUIRED — FLOW CONTROL PROPOSED _____ CFS % _____ OF 2-YEAR, 24-HOUR STORM EVENT

MAINTENANCE AND INSPECTION PLAN

15 HAVE YOU INCLUDED A STORMWATER MAINTENANCE AND INSPECTION PLAN? ☒ YES ☐ NO

16 CONTACT INFORMATION FOR THE PARTY/PARTIES THAT WILL BE LEGALLY RESPONSIBLE FOR PERFORMING/ CONTRACTING THE INSPECTIONS AND MAINTENANCE OF THE STORMWATERFACILITIES:

NAME Casey Myers - Public Work Director

AFFILIATION/RESPONSIBILITY City of John Day Public Works

PHONE 541-620-3090 EMAIL myerse@grantcounty-or.gov

NAME _____

AFFILIATION/RESPONSIBILITY

PHONE EMAIL _____

NAME

AFFILIATION/RESPONSIBILITY

PHONE EMAIL

OTHER RELEVANT INFORMATION

SEE CALCULATIONS

City of John Day Wastewater Treatment Facility

J.O. SJD 08-001

2-7-2023
Rev. 2-14-2023

STORM WATER MANAGEMENT DESIGN CALCULATIONS

SISUL ENGINEERING
A Division of Sisul Enterprises, Inc.
158 E Main Street
John Day, OR 97845
phone: (541) 575-3777
fax: (541) 575-3778

Project Description:
This project involves the redevelopment of a sawmill site to create a wastewater treatment facility and access road. The existing road (now known as West End of 7th Street) was dirt, rock, and gravel providing access to the site and surrounding businesses and ODFW Screen Shop. The treatment area was part of the log yard for the previous sawmill. Prior to this the entire area was dredged with a bucket dredge during the 1930-1940's mining activities in the area.

The improvements will include improving the dirt/gravel access to a paved street, with curbs, sidewalk and planter area. The wastewater treatment facility will include structures, paved parking and landscaping.

Climate:

In John Day, the summers are short, hot, dry, and mostly clear and the winters are very cold, snowy, and partly cloudy. Over the course of the year, the temperature typically varies from *27°F* to *89°F* and is rarely below *11°F* or above *97°F*.
(Information from https://weatherspark.com)

Average Monthly Rainfall in John Day

The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the corresponding average snowfall.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	1.0″	0.9″	0.9″	0.8″	1.2″	0.9″	0.4″	0.3″	0.4″	0.7″	1.2″	1.2″

Soil permeability:

Attached is information from USDA Soil Survey of Grant Count, Oregon, Central Part, issued February 1981. Due to the dredging activity the sites soils are classified as (10 Dump) consisting of tailing from gold dredging. While the consistency varies randomly across the site, generally the material is made up of cobbles and pebbles with some soil and organic matter that has been interduced since the tailing were leveled. No Hydrologic Soil Group is identified but, since it is highly permeable it fits closest with Group A.

Land Use:
The project are is currently vacant land, previously part of a sawmill operation. The surrounding area is generally industrial and commercial. (current surrounding property uses are ODFW Screen Shop, OTEC Power Company, Clarks Disposal, Iron Triangle Construction/Logging and a couple residences.

Contributing Area:

The construction of 7th Street from a dirt/gravel road to a paved street. The current development of surrounding sites / topography also contribute to the runoff coming onto the site.

Existing Conditions:

7th Street ***Area #1*** & other Contributing Area
- Pre Development = Existing AC Impervious = 0.092 Ac.
- Pre Development = Existing Cobble/Gravel/dirt Pervious = 0.833 Ac.

7th Street ***Area #2*** & other Contributing Area
- Pre Development = Existing Cobble/Gravel/dirt Pervious = 0.857 Ac.

7th Street ***Area #3*** & other Contributing Area
- Pre Development = Existing Cobble/Gravel/dirt Pervious = 0.474 Ac.

Wastewater Treatment Facility Site ***Area #4***
- Pre Development = Existing Cobble/Gravel/dirt Pervious = 2.100 Ac.

Developed Conditions:

7th Street ***Area #1*** & other Contributing Area
- Post Development = AC/Conc. Impervious = 0.603 Ac.
- Post Development = Landscaped Pervious = 0.197 Ac.
- Post Development = Gravel Pervious = 0.125 Ac.

7th Street ***Area #2*** & other Contributing Area
- Post Development = AC/Conc. Impervious = 0.259 Ac.
- Post Development = Landscaped Pervious = 0.189 Ac.
- Post Development = Gravel Pervious = 0.409 Ac.

7th Street ***Area #3*** & other Contributing Area
- Post Development = AC/Conc. Impervious = 0.211 Ac.
- Post Development = Landscaped Pervious = 0.263 Ac.

Wastewater Treatment Facility Site ***Area #4***
- Post Development = AC/Conc./Roof Impervious = 1.200 Ac.
- Post Development = Landscaped Pervious = 0.900 Ac.

Best Management Practices (BMPs):

- Catch Basins collecting runoff from street/parking areas will have sumps to collect sediment/debris.
- Last Structure (manhole or catch basin) prior to runoff entering infiltration area will be baffled to create oil/grease separator.
- Sidewalk runoff will drain across landscape area prior to entering street.
- Minimum Street width for the anticipated passenger, truck traffic and emergency vehicles.
- Using onsite infiltration for storm runoff for the site, no direct discharge to any stream/river.
- Xeriscaped infiltration area/swale for drought resistance and low maintenance.

POLLUTANTS OF CONCERN:

Pollutants of concern typically expected in City streets and parking areas runoff are sediment, oil and grease, polycyclic aromatic hydrocarbons (PAH), and garbage (cans, cigarette butts, food wrappers, Styrofoam, pet waste, etc)

Because the street will have a very low ADT, pollutant loads and concentrations are expected to be very low. Much of the activity at the wastewater treatment facility will be City employees, City vehicles - maintenance and control of the vehicles that could contribute to the oil/grease in storm runoff will be monitored by the user (THE CITY).

STORMWATER MANAGEMENT PLAN NARRATIVE:

All storm runoff will be infiltrated on the project area, there is no discharge to the John Day River. The grading and natural topography does not allow any runoff to reach the river, should an event exceed the capacity of one of the infiltration areas, it will pond in that area until it infiltrates.

To the extent possible the storm water is routed to multiple infiltration areas to minimize impacts. When storm water is collected off impervious areas with structures (catch basins) they are equipped with sumps for sediment & debris and baffles to separate oil/grease.

The following calculations are based on the Central Oregon Stormwater Manual (COSM), Aug. 2001.

The Pre-Development runoff was not calculated due to the fact that all of the runoff will be contained on-site. There will be no release rate from this project to any stream, river, or traditional storm system.

DESIGN INFORMATION:

The contributing areas were identified previously.

Runoff Coefficients: (Attached COSM Table of Runoff numbers) the Soils Map does identify a Hydrological Group for this area but do to the high infiltration ability of the tailing we are using Hydrological Group 'A'.

Pavement, Concrete, Roofs	$C_N = 98$
Gravel Parking, Storage, Dwys	$C_N = 76$
Brush/Grass Light Ground Cover (Xeriscaped)	$C_N = 48$

Areas with multiple types have weighted runoff numbers, see below.

Area #1	
Impervious	$C_N = 98$
Pervious	$C_N = [(0.197*48) + (0.125*76)] / 0.322 = 59$
Area #2	
Impervious	$C_N = 98$
Pervious	$C_N = [(0.189*48) + (0.409*76)] / 0.598 = 67$
Area #3	
Impervious	$C_N = 98$
Pervious	$C_N = 48$
Area #4	
Impervious	$C_N = 98$
Pervious	$C_N = 48$

Time of Concentration: Due to the very small size of the individual drainage basins and nature of the development, and to be conservative, the minimum Time of Concentration is used.

Time of Concentration $T_C = 5.0$ minutes

Infiltration Rate: With no soil data from NRCS, the infiltration rates are based on past projects and infiltration testing done on them, in the same general area & type of material. During construction the individual infiltration areas should be tested.

Modified Soil for base of infiltration area = sandy native topsoil w/ mulch and organics added

Infiltration Rate = 3 in/hr

Native Tailings Material = cobbles, pebbles, and sand (local infiltration test have ranged form 10-40+ in/hr depending on the site, will use:

Infiltration Rate = 10 in/hr

Water Quality Design Storm

Storm is Modeled with KING COUNTY DEPARTMENT OF PUBLIC WORKS, Surface Water Management Division, HYDROGRAPH PROGRAMS, Version 4.20

The water Quality Design Storm is 50% of the 2-Year, 24-hour event, for this project that is in climate zone 7. The 2yr isopluvial (attached) shows the2 year event precipitation as 1.8 inches.

50% of 2-yr, 24hr, event = 0.90 inches

Area#1 – ½ 2yr, 24 hour Event

```
S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
2,24,0.9
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********   2-YEAR  24-HOUR STORM  ****   .90" TOTAL PRECIP. *********

------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.603,98,0.322,59,5

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
        .9         .6  98.0     .3  59.0         5.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .12           7.67           1519

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa1.2yr
```

Area#2 – ½ 2yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
2,24,0.90
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********   2-YEAR  24-HOUR STORM  ****   .90" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.259,98,0.598,67,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
        .9         .3  98.0      .6  67.0         5.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .05           7.67             652

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa2.2yr
```

Area#3 – ½ 2yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
2,24,0.90
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********   2-YEAR  24-HOUR STORM  ****   .90" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.211,98,0.263,48,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
        .5         .2  98.0      .3  48.0         5.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .04           7.67             531

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa3.2yr
```

Area#4 – ½ 2yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
2,24,0.90
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********   2-YEAR  24-HOUR STORM  ****   .90" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
1.200,98,0.900,48,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       2.1        1.2  98.0      .9  48.0         5.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .24           7.67            3024

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa4.2yr
```

Water Quantity Design Storm

Storm is Modeled with KING COUNTY DEPARTMENT OF PUBLIC WORKS, Surface Water Management Division, HYDROGRAPH PROGRAMS, Version 4.20

The water Quantity Design Storm is a 10-Year, 24-hour event, for this project. The 10yr isopluvial (attached) shows the 10 year event precipitation as 2.0 inches.

10-yr, 24hr, event = 2.0 inches

Area#1 – 10yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
10,24,2.0
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  2.00" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.322,59,0.603,98,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
        .9         .3  59.0      .6  98.0         5.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .30           7.67           3941

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa1.10y
```

Area#2 – 10yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
10,24,2.0
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  2.00" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
.598,67,0.259,98,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
        .9         .6  67.0      .3  98.0         5.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .13          7.67          2044

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa2.10y
```

Area#3 – 10yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
10,24,2.0
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  2.00" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
.263,48,0.211,98,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
        .5         .3  48.0      .2  98.0         5.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .11          7.67          1359

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa3.10y
```

Area#4 – 10yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
10,24,2.0
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
*********  10-YEAR  24-HOUR STORM  ****  2.00" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.900,48,1.200,98,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       2.1         .9  48.0    1.2  98.0         5.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .61          7.67          7729

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa4.10y
```

Check Ability to Infiltrate Large (100-year) Design Storm

Storm is Modeled with KING COUNTY DEPARTMENT OF PUBLIC WORKS, Surface Water Management Division, HYDROGRAPH PROGRAMS, Version 4.20

The Design Storm is a 100-Year, 24-hour event. The 100yr isopluvial (attached) shows the 100 year event precipitation as 2.8 inches.

100-yr, 24hr, event = 2.8 inches

Area#1 – 100yr, 24 hour Event

```
S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
100,24,2.8
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  2.80" TOTAL PRECIP. *********

------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.322,59,0.603,98,5

DATA PRINT-OUT:

  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
        .9         .3  59.0     .6  98.0         5.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .44           7.67           5901

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa1.100
```

Area#2 – 100yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
100,24,2.8
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  2.80" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.598,67,0.259,98,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
        .9         .6  67.0      .3  98.0         5.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .20           7.67            3476

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa2.100
```

Area#3 – 100yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
100,24,2.8
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  2.80" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.263,48,0.211,98,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
        .5         .3  48.0      .2  98.0         5.0

  PEAK-Q(CFS)    T-PEAK(HRS)     VOL(CU-FT)
       .15           7.67            2001

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa3.100
```

Area#4 – 100yr, 24 hour Event

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
100,24,2.8
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 100-YEAR  24-HOUR STORM  ****  2.80" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.900,48,1.200,98,5

DATA PRINT-OUT:
  AREA(ACRES)     PERVIOUS     IMPERVIOUS    TC(MINUTES)
                  A     CN     A     CN
       2.1         .9  48.0    1.2  98.0         5.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .87          7.67          11305

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa4.100
```

Maximum Capacity of Each Infiltration Area

Storm is Modeled with KING COUNTY DEPARTMENT OF PUBLIC WORKS, Surface Water Management Division, HYDROGRAPH PROGRAMS, Version 4.20

The Design Storm each of these areas can handle is larger than a 100-Year, 24-hour event, to determine the amount that each area can handle the program was run, increasing the prec. amount until it maximized the storage and infiltration capacity of the area. The prec. is express as a multiple of the 100 yr event for each area.

Area#1 – 1.1x100yr, 24 hour Event = 3.08 inches

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
999,24,3.08
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 1.1x 100-YEAR  24-HOUR STORM  ****  3.08" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.322,59,0.603,98,5

DATA PRINT-OUT:
  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
        .9        .3  59.0     .6  98.0        5.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .48          7.67           6620

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
a1.max
```

Area#2 – 2.0x100yr, 24 hour Event = 5.60 inches

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
999,24,5.6
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 2x 100-YEAR  24-HOUR STORM  ****  5.60" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.598,67,0.259,98,5

DATA PRINT-OUT:
  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
        .9        .6  67.0     .3  98.0        5.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .68          7.67           9887

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
a2.max
```

Area#3 – 3.4x100yr, 24 hour Event = 9.52 inches

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION: 1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
999,24,9.52
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 3.4x 100-YEAR  24-HOUR STORM  ****  9.52" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.263,48,0.211,98,5

DATA PRINT-OUT:
  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
        .5        .3  48.0     .2  98.0        5.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
       .68          7.67           9945

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
a3.max
```

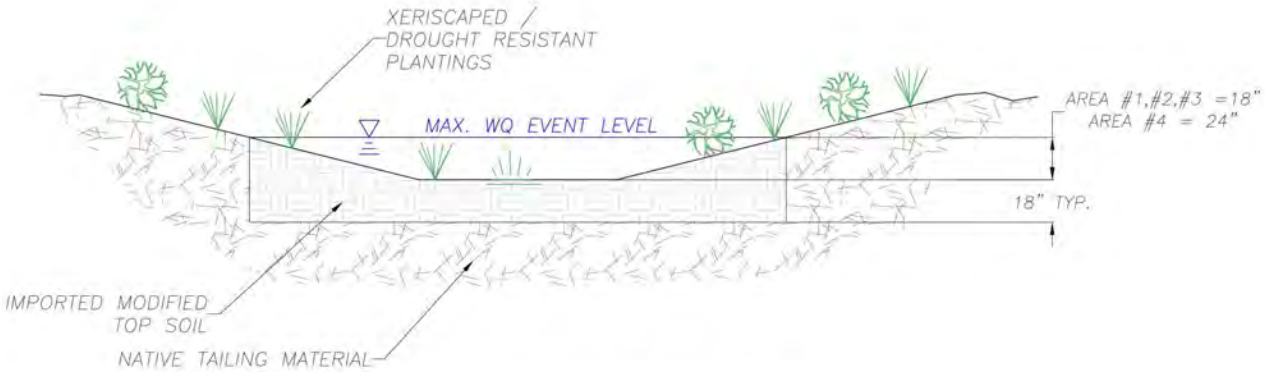
Area#4 – 7x100yr, 24 hour Event = 19.6 inches

```
SBUH/SCS METHOD FOR COMPUTING RUNOFF HYDROGRAPH

STORM OPTIONS:

1 - S.C.S. TYPE-1A
2 - 7-DAY DESIGN STORM
3 - STORM DATA FILE

SPECIFY STORM OPTION:  1

S.C.S. TYPE-1A RAINFALL DISTRIBUTION
ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
999,24,19.6
------------------------------------------------------------------------
******************** S.C.S. TYPE-1A DISTRIBUTION ********************
********* 7x 100-YEAR  24-HOUR STORM  **** 19.60" TOTAL PRECIP. *********
------------------------------------------------------------------------
ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO.  1
0.900,48,1.200,98,5

DATA PRINT-OUT:
  AREA(ACRES)    PERVIOUS    IMPERVIOUS   TC(MINUTES)
                 A     CN     A     CN
       2.1        .9  48.0    1.2  98.0        5.0

  PEAK-Q(CFS)   T-PEAK(HRS)    VOL(CU-FT)
      8.79          7.67         119433

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
a4.max
```

Routing Design Storm Events

The Routing of the Storms is done with KING COUNTY DEPARTMENT OF PUBLIC WORKS, Surface Water Management Division, HYDROGRAPH PROGRAMS, Version 4.20

Because the infiltration areas have two rates of infiltration a spreadsheet was used to develop the routing data, using the modified soil information for the base and lower portion of the area, and native tailing information for the upper portion of the area. Since this was accounted for in the spreadsheet, the permibility rate used by the program was set to zero. Below is a typical diagram for the infiltration area cross section.



TYPICAL INFILTRATION AREA

NTS

INFILTRATION AREA ROUTING DATA

Area #1 - Infiltration Area at Patterson Rd and West 7th Street

Modified Soil material at bottom				
Infiltration Rate	3	in/hr	20	min/inch
Native Tailings Material				
Infiltration Rate	10	in/hr	6	min/inch

	Infiltration Area				
	B	C	D	E	F
	Stage	Elevation (ft)	Bottom Area (sq.ft)	Storage Volume (cu.ft.)	Infiltration Rate (cfs)
infil. area Bottom ->	1	3039.00	48.0	0.0	0.00333
	2	3039.50	159.0	51.8	0.01104
Mod. Soil	3	3040.00	325.0	172.8	0.02257
Native Mat.	4	3040.50	537.0	388.3	0.07164
	5	3041.00	778.0	717.0	0.12743
infil. area Top ->	6	3041.50	951.0	1149.3	0.16748

Area#1 – Routing Storms thru Infiltration Area

```
RESERVOIR ROUTING INFLOW/OUTFLOW ROUTINE

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
wwa1.det
 DISPLAY ROUTING DATA (Y or N)? y

ROUTING DATA:
STAGE(FT)   DISCHARGE(CFS)   STORAGE(CU-FT)   PERM-AREA(SQ-FT)
    .00            .00              .0             48.0
    .50            .01             51.8            159.0
   1.00            .02            172.8            325.0
   1.50            .07            388.3            537.0
   2.00            .13            717.0            778.0
   2.50            .17           1149.0            951.0

AVERAGE PERM-RATE:    .0 MINUTES/INCH

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa1.2yr (Water Quality Event)

INFLOW/OUTFLOW ANALYSIS:
  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .12                .05                1538

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3439.00              8.17              3440.24

  PEAK STORAGE:      270 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa1.iwq
```

```
SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa1.10y  (Water Quantity Event)

INFLOW/OUTFLOW ANALYSIS:
  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .30                .13                3917

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3439.00              8.17              3440.98

  PEAK STORAGE:      700 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa1.10i

SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa1.100  (Large Event, 100-yr Check)

INFLOW/OUTFLOW ANALYSIS:
  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .44                .16                6000

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3439.00              8.17              3441.37

  PEAK STORAGE:     1030 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa1100.inf

SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
a1.max (Maximum Event, 1.1x 100-yr Event)

INPUTED ROUTING-DATA HAS BEEN EXTRAPOLATED.

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .48                .17                6534

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3439.00              8.17              3441.51

  PEAK STORAGE:     1150 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
a1-st.max
```

INFILTRATION AREA ROUTING DATA

Area #2 - Infiltration Area at West 7th Street Sta 3+50

Modified Soil material at bottom

Infiltration Rate	3	in/hr	20	min/inch

Native Tailings Material

Infiltration Rate	10	in/hr	6	min/inch

	Infiltration Area				
	B	C	D	E	F
	Stage	Elevation (ft)	Bottom Area (sq.ft)	Storage Volume (cu.ft.)	Infiltration Rate (cfs)
infil. area Bottom ->	1	3041.50	135.0	0.0	0.00938
	2	3042.00	376.0	127.8	0.02611
Mod. Soil	3	3042.50	565.0	363.0	0.03924
Native Mat.	4	3043.00	783.0	700.0	0.08970
	5	3043.50	1029.0	1153.0	0.14664
infil. area Top ->	6	3044.00	1475.0	1779.0	0.24988

Area#2 – Routing Storms thru Infiltration Area

```
RESERVOIR ROUTING INFLOW/OUTFLOW ROUTINE

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
wwa2.det
 DISPLAY ROUTING DATA (Y or N)? y

ROUTING DATA:
STAGE(FT)   DISCHARGE(CFS)   STORAGE(CU-FT)   PERM-AREA(SQ-FT)
    .00            .01              .0            135.0
    .50            .03            127.8           376.0
   1.00            .04            363.0           565.0
   1.50            .09            700.0           783.0
   2.00            .15           1153.0          1029.0
   2.50            .25           1779.0          1475.0

AVERAGE PERM-RATE:    .0 MINUTES/INCH

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa2.2yr  (Water Quality Event)

INFLOW/OUTFLOW ANALYSIS:
  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .05                .02                1007

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3041.50              8.50              3041.79

  PEAK STORAGE:       70 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa2.iwq
```

```
SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa2.10y  (Water Quantity Event)

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .13                .04                2087

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3041.50              8.50              3042.40

  PEAK STORAGE:      310 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa2.10i

SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa2.100  (Large Event, 100-yr Check)

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .20                .07                3502

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3041.50              8.67              3042.78

  PEAK STORAGE:      550 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa2100.inf

SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
a2.max (Maximum Event, 2.0x 100-yr Event)

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .68                .24                9850

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3041.50              8.50              3043.95

  PEAK STORAGE:     1710 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
a2-st.max
```

INFILTRATION AREA ROUTING DATA

Area #3 - Infiltration Area at West 7th Street Sta 8+75

Modified Soil material at bottom

Infiltration Rate	3	in/hr	20	min/inch

Native Tailings Material

Infiltration Rate	10	in/hr	6	min/inch

	Infiltration Area				
	B	C	D	E	F
	Stage	Elevation (ft)	Bottom Area (sq.ft)	Storage Volume (cu.ft.)	Infiltration Rate (cfs)
infil. area Bottom ->	1	3048.00	108.0	0.0	0.00750
	2	3048.50	279.0	96.8	0.01938
Mod. Soil	3	3049.00	489.0	288.8	0.03396
Native Mat.	4	3049.50	739.0	595.8	0.09183
	5	3050.00	1028.0	1037.5	0.15873
infil. area Top ->	6	3050.50	1486.0	1666.0	0.26475

Area#3 – Routing Storms thru Infiltration Area

```
RESERVOIR ROUTING INFLOW/OUTFLOW ROUTINE

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
wwa3.det
 DISPLAY ROUTING DATA (Y or N)? y

ROUTING DATA:
STAGE(FT)   DISCHARGE(CFS)   STORAGE(CU-FT)   PERM-AREA(SQ-FT)
    .00            .01              .0            108.0
    .50            .02             96.8           279.0
   1.00            .03            288.8           489.0
   1.50            .09            595.8           739.0
   2.00            .16           1037.5          1028.0
   2.50            .26           1666.0          1486.0

AVERAGE PERM-RATE:    .0 MINUTES/INCH

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa3.2yr  (Water Quality Event)

INFLOW/OUTFLOW ANALYSIS:
  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .04                .02                 841

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3048.00              8.17              3048.33

  PEAK STORAGE:       60 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa3.iwq
```

```
SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa3.10y  (Water Quantity Event)

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .11                .03                1390

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3048.00              8.33              3048.91

  PEAK STORAGE:      250 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa3.10i

SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa3.100  (Large Event, 100-yr Check)

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .15                .05                2158

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3048.00              8.33              3049.17

  PEAK STORAGE:      390 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa3100.inf

SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
a3.max (Maximum Event, 3.4x 100-yr Event)

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .68                .26                9937

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3048.00              8.17              3050.47

  PEAK STORAGE:     1630 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
a3-st.max
```

INFILTRATION AREA ROUTING DATA

Area #4 - Infiltration Area at Treatment Plant & Parking Lot

Modified Soil material at bottom				
Infiltration Rate	3	in/hr	20	min/inch
Native Tailings Material				
Infiltration Rate	10	in/hr	6	min/inch

	Infiltration Area				
	B	C	D	E	F
	Stage	Elevation (ft)	Bottom Area (sq.ft)	Storage Volume (cu.ft.)	Infiltration Rate (cfs)
infil. area Bottom ->	1	3045.00	900.0	0.0	0.06250
Mod. Soil	2	3046.00	1606.0	1253.0	0.11153
Native Mat.	3	3047.00	2525.0	3318.5	0.32426
	4	3048.00	4966.0	7825.0	0.88931
	5	3049.00	8894.0	14755.0	1.79856
infil. area Top ->	6	3050.00	12962.0	25683.0	2.74023

Area#4 – Routing Storms thru Infiltration Area

```
RESERVOIR ROUTING INFLOW/OUTFLOW ROUTINE

SPECIFY [d:][path]filename[.ext] OF ROUTING DATA
wwa4.det
 DISPLAY ROUTING DATA (Y or N)? y

ROUTING DATA:
STAGE(FT)    DISCHARGE(CFS)    STORAGE(CU-FT)    PERM-AREA(SQ-FT)
    .00             .06                .0             900.0
   1.00             .11             1253.0            1606.0
   2.00             .32             3318.5            2525.0
   3.00             .89             7825.0            4966.0
   4.00            1.80            14755.0            8894.0
   5.00            2.74            25683.0           12962.0

AVERAGE PERM-RATE:    .0 MINUTES/INCH

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa4.2yr  (Water Quality Event)

INFLOW/OUTFLOW ANALYSIS:
  PEAK-INFLOW(CFS)    PEAK-OUTFLOW(CFS)    OUTFLOW-VOL(CU-FT)
         .24                 .08                 5905

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)    PEAK-STAGE-ELEV(FT)
     3045.00               8.50               3045.26

  PEAK STORAGE:      320 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa4.iwq
```

```
SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa4.10y  (Water Quantity Event)

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .61               .15                8337

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3045.00              8.67              3046.17

  PEAK STORAGE:     1600 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa4.10i

SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
wwa4.100  (Large Event, 100-yr Check)

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
         .87               .25               11603

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3045.00              8.50              3046.63

  PEAK STORAGE:     2560 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
wwa4100.inf

SPECIFY: C - CONTINUE, N - NEWJOB, P - PRINT, S - STOP, R - REVISE
c

ENTER [d:][path]filename[.ext] OF COMPUTED HYDROGRAPH:
a4.max (Maximum Event, 7.0x 100-yr Event)

INFLOW/OUTFLOW ANALYSIS:

  PEAK-INFLOW(CFS)   PEAK-OUTFLOW(CFS)   OUTFLOW-VOL(CU-FT)
        8.79               2.70              119501

  INITIAL-STAGE(FT)  TIME-OF-PEAK(HRS)   PEAK-STAGE-ELEV(FT)
     3045.00              8.50              3049.96

  PEAK STORAGE:    25200 CU-FT

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
a4-st.max
```

CONCLUSION:
Stormwater treatment on this project will achieve pollutant removal to the maximum extent practicable by treating runoff from 100% of the CIA with preferred BMPs. Erosion and sediment control BMPs will be in place throughout construction to prevent runoff from disturbed areas discharging to waterways.

Each of the infiltration areas will have a modified topsoil/mulch mixture, to facilitate the growth of drought resistant plantings. This will material will make up the bottom 18"-24" of the infiltration areas. The quality storm will be infiltrated thru this material, the water quantity and larger storm events will also infiltrate thru this material and as the water level increase in the infiltration area, the upper section is native tailings that will provide a much higher infiltration rate.

Below is a summary of each infiltration area, storm event and levels reached in the infiltration area.

WATER QUALITY STORM (50% of 2-YR, 24-HR Event)

Contributing Area	Pervious (Acres)	Impervious (Acres)	Post - Runoff Amount (cu.ft.)	Infiltration Rate (in/hr)	Total Infiltration Area Storage (cu.ft.)	Event Peak Storage Used (cu.ft.)	Peak Depth of Water (ft)	Amount Infiltrated %
Area #1	0.322	0.603	1519	3.00	1149	270	1.24	100
Area #2	0.598	0.259	652	3.00	1779	70	0.29	100
Area #3	0.263	0.211	531	3.00	1666	60	0.33	100
Area #4	0.900	1.200	3024	3.00	25683	320	0.26	100

WATER QUANTITY STORM (10-YR, 24-HR Event)

Contributing Area	Pervious (Acres)	Impervious (Acres)	Post - Runoff Amount (cu.ft.)	Infiltration Rate (in/hr)	Total Infiltration Area Storage (cu.ft.)	Event Peak Storage Used (cu.ft.)	Peak Depth of Water (ft)	Amount Infiltrated %
Area #1	0.322	0.603	3941	3.00 - 10.00	1149	700	1.98	100
Area #2	0.598	0.259	2044	3.00	1779	310	0.90	100
Area #3	0.263	0.211	1359	3.00	1666	250	0.91	100
Area #4	0.900	1.200	7729	3.00	25683	1600	1.17	100

LARGE STORM - ABILTY TO INFILTRATE (100-YR, 24-HR Event)

Contributing Area	Pervious (Acres)	Impervious (Acres)	Post - Runoff Amount (cu.ft.)	Infiltration Rate (in/hr)	Total Infiltration Area Storage (cu.ft.)	Event Peak Storage Used (cu.ft.)	Peak Depth of Water (ft)	Amount Infiltrated %
Area #1	0.322	0.603	5901	3.00 - 10.00	1149	1030	2.37	100
Area #2	0.598	0.259	3476	3.00	1779	550	1.28	100
Area #3	0.263	0.211	2001	3.00	1666	390	1.17	100
Area #4	0.900	1.200	11305	3.00	25683	2560	1.63	100

MAXIMUM CAPACITY OF EACH INFILTRATION AREA

Contributing Area	Pervious (Acres)	Impervious (Acres)	Precip. Amount (inches)	Infiltration Rate (in/hr)	Total Infiltration Area Storage (cu.ft.)	Event Peak Storage Used (cu.ft.)	Equivulent Storm Event
Area #1	0.322	0.603	3.08	3.00 - 10.00	1149	1150	1.1x 100-yr
Area #2	0.598	0.259	5.60	3.00 - 10.00	1779	1710	2.0x 100-yr
Area #3	0.263	0.211	9.52	3.00 - 10.00	1666	390	1.1x 100-yr
Area #4	0.900	1.200	19.60	3.00 - 10.00	25683	2560	1.1x 100-yr

Attachment List

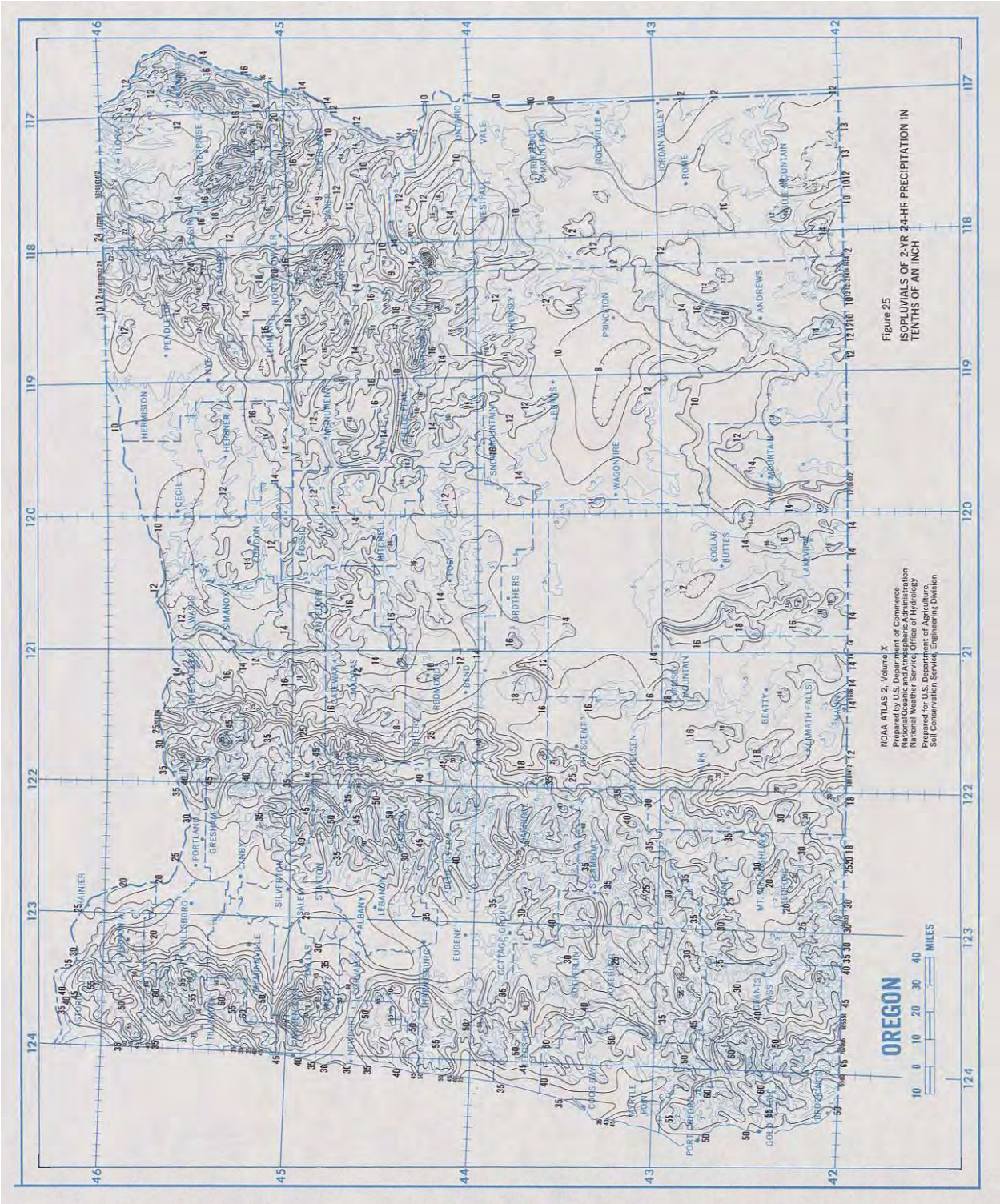
Attachment A: Central Oregon Storm Water Manual Runoff Coefficients
Attachment B: Central Oregon Storm Water Isopluvials
Attachment C: Sections of Grant County Soil Survey Report
Attachment D: Map of Site and Contributing Areas

TABLE 5-1
RUNOFF CURVE NUMBERS
ANTECEDENT RUNOFF CONDITION (ARC) II

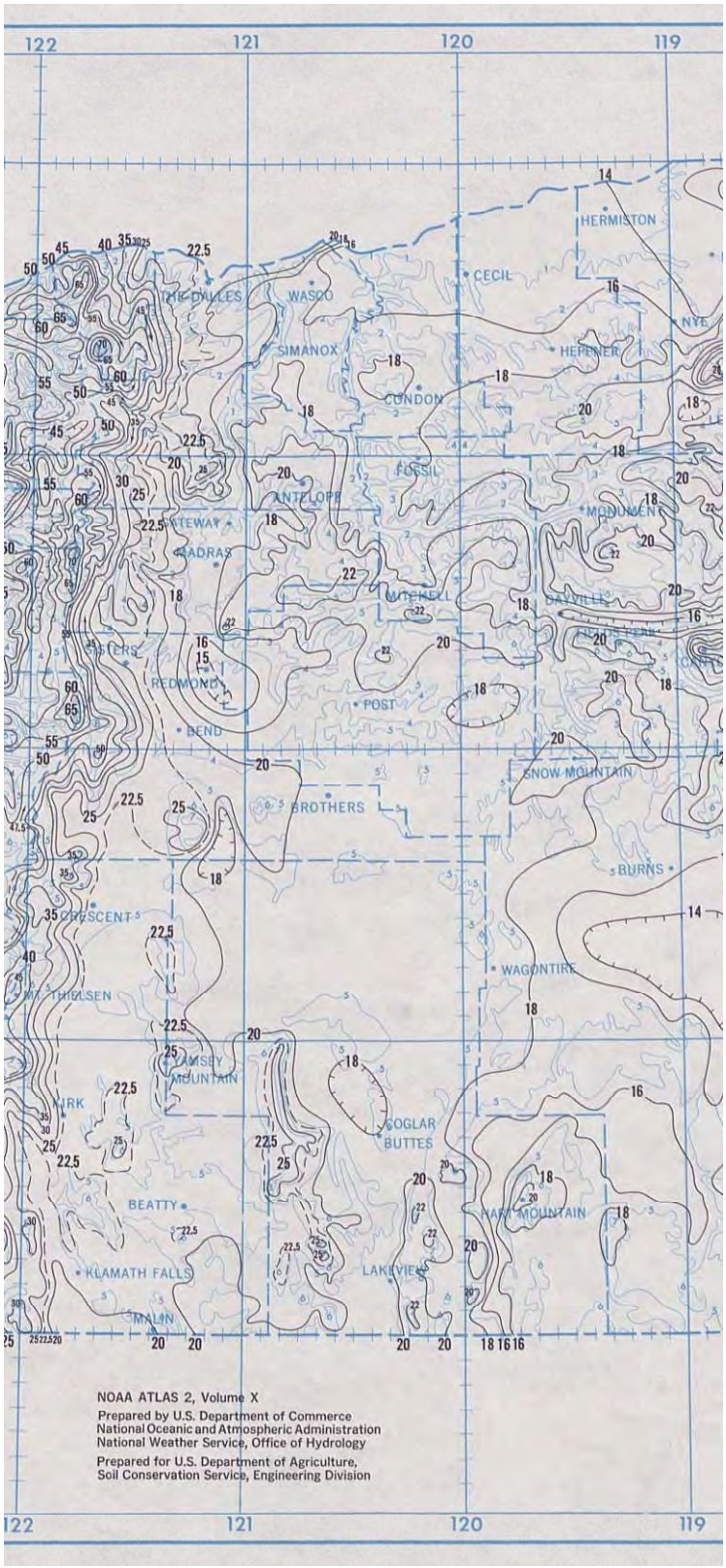
Cover Type And Hydrologic Condition — *Hydrologic Soil Group:*	*A*	*B*	*C*	*D*
Open Space (lawns, parks, golf courses, cemeteries, landscaping, etc.): [1]				
Poor condition (grass cover <50% of the area)	68	79	86	89
Fair condition (grass cover on 50% to 75% of the area)	49	69	79	84
Good condition (grass cover on >75% of the area)	39	61	74	80
Impervious Areas:				
Open water bodies: lakes, wetlands, ponds, etc.	100	100	100	100
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)	98	98	98	98
Streets and Roads:				
Paved: curbs and storm sewers (excluding right-of-way)	98	98	98	98
Paved: open ditches/swales (including right-of-way)	83	89	92	93
Gravel (including right-of-way)	76	85	89	91
Dirt (including right-of-way)	72	82	87	89
Porous Pavers and Permeable Interlocking Concrete (assume 85% impervious and 15% fair condition lawn):	91	94	95	96
Urban Districts:				
Commercial and Business (average 85% impervious)	89	92	94	95
Industrial (average 72% impervious)	81	88	91	93
Residential Districts By Average Lot Size:				
1/8 acre or less or townhouses (average 65% impervious)	77	85	90	92
1/4 acre (average 38% impervious)	61	75	83	87
1/3 acre (average 30 % impervious)	57	72	81	86
1/2 acre (average 25% impervious)	54	70	80	85
1 acre (average 20% impervious)	51	68	79	84
2 acres (average 12% impervious)	46	65	77	82
Newly graded areas (pervious areas only, no vegetation)	77	86	91	94
Farmsteads – buildings, lanes, driveways, and surrounding lots	59	74	82	86
Pasture, Grassland, or Range-Continuous Forage for Grazing:				
Poor condition (ground cover <50% or heavily grazed with no mulch)	68	79	86	89
Fair condition (ground cover 50% to 75% and not heavily grazed)	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
Meadow (continuous grass, protected from grazing and generally mowed for hay)	30	58	71	78
Cultivated Agricultural Lands:				
Row Crops (good) e.g. corn, sugar beets, soy beans	64	75	82	85
Small Grain (good) e.g. wheat, barley, flax	60	72	80	84
Brush-Weed-Grass Mixture (with brush the major element):				
Poor (<50% ground cover)	48	67	77	83
Fair (50% to 75% ground cover)	35	56	70	77
Good (>75% ground cover)[2]	30	48	65	73
Woods:				
Poor (Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning)	45	66	77	83
Fair (Woods are grazed but not burned, and some forest litter covers the soil)	36	60	73	79
Good (Woods are protected from grazing, and litter and brush adequately cover the soil)	30	55	70	77

APPENDIX 5A – PRECIPITATION MAPS

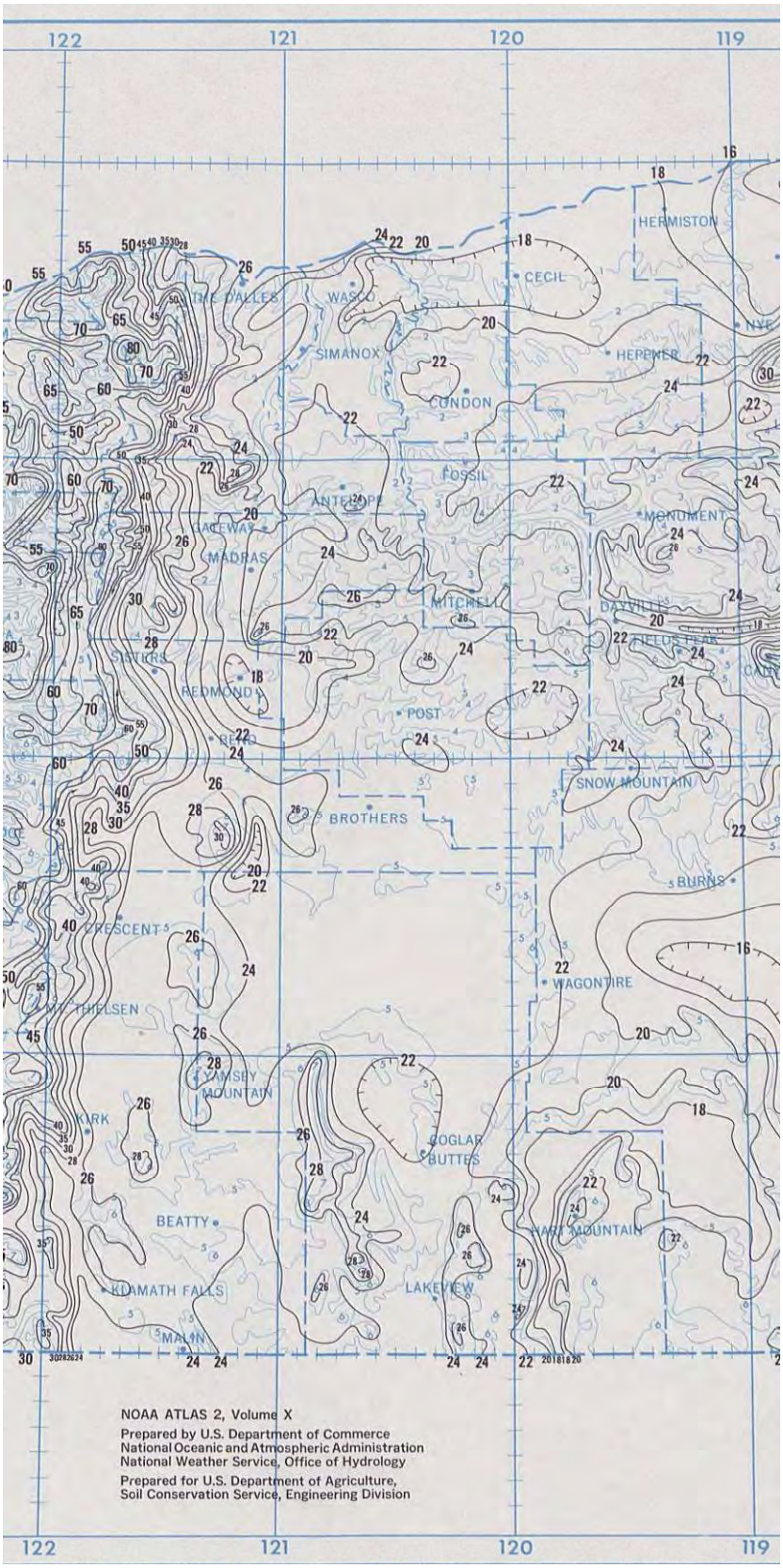
(Note: Table 5-5 includes 24-hour storm depths for selected areas, as interpreted from these isopluvial maps.)



2-year, 24-hour Isopluvial Map

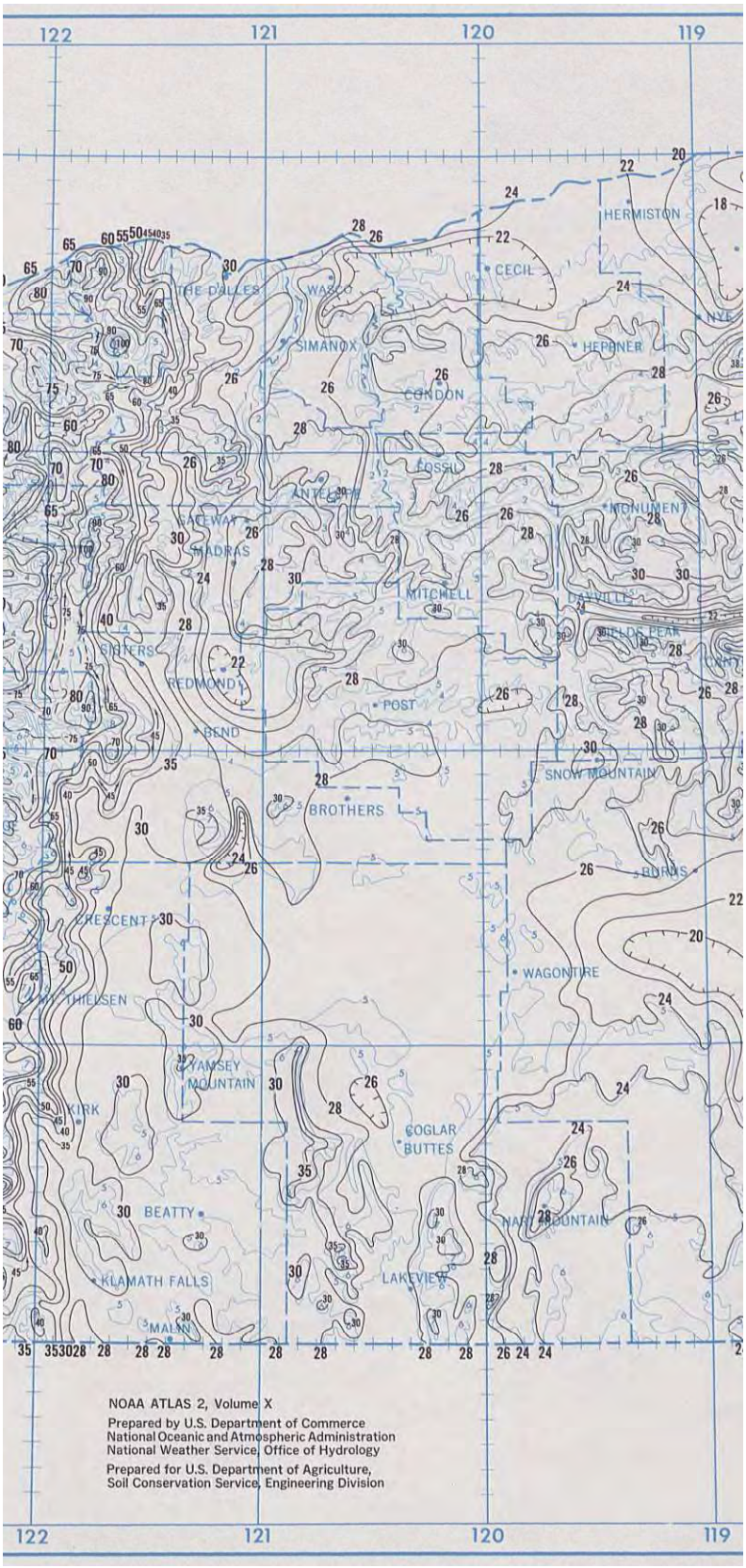


10-year, 24-hour Isopluvial Map



25-year, 24-hour Isopluvial Map

50-year, 24-hour Isopluvial Map



100-year, 24-hour Isopluvial Map

calcareous; moderately alkaline (pH 8.0); clear smooth boundary; 4 to 7 inches thick.

C3—33 to 36 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; many medium distinct dark brown (7.5YR 4/4) mottles; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine pores; noncalcareous; moderately alkaline (pH 8.0); abrupt smooth boundary; 2 to 6 inches thick.

IIC4—36 to 60 inches; stratified sand and very gravelly sand; single grained; loose.

Depth to bedrock is more than 60 inches. Depth to stratified sand and very gravelly sand ranges from 15 to 40 inches. Between a depth of 10 inches and the stratified horizon of sand and very gravelly sand, the material is silt loam or light silty clay loam that, in places, has thin layers of loam or sandy loam. Depth to distinct or prominent mottles is 24 to 36 inches. The soil is calcareous in the A horizon but is noncalcareous in some parts between depths of 10 and 20 inches. In the A horizon value is 2 or 3 moist and 4 or 5 dry.

9—Dayville silt loam. This soil is on bottom lands. Slopes are 0 to 2 percent. Areas range from 10 to about 100 acres in size.

Included with this soil in mapping are areas of Veazie, Boyce, and Ricco soils. These areas make up as much as 15 percent of the mapping unit.

Runoff is slow, and the hazard of erosion is moderate. Occasional flooding occurs in winter or early in spring. Capability unit IIw–1 irrigated; not placed in a range site; wildlife group 2.

Dumps

10—Dumps. Dumps consist of tailings from gold dredging. They are mainly on bottom land. They consist mainly of rounded and subrounded stones, cobbles, and pebbles in large alternating parallel ridges and troughs. The elevation at the top of the ridge is generally 15 to 20 feet above that of the bottom of the trough. The tops of the ridges are about 100 feet apart and 200 to about 1,500 feet long. The troughs are generally partly filled with water. Willows and cottonwoods grow in places near the water edge. Most of the fine material was washed away during dredging. In a few places an occasional ridge is soil material.

This miscellaneous area is used mainly for wildlife habitat. Some areas have been smoothed and are used for building sites. Capability unit VIIIs; not placed in a range site; wildlife group 2.

Fopiano Series

The Fopiano series consists of well drained soils that formed in colluvium and residuum weathered from old sediment and tuff on uplands. Slopes are 2 to 40 percent. Elevation is 3,800 to 5,000 feet. The vegetation is Idaho fescue, bluebunch wheatgrass, Sandberg bluegrass, and low sagebrush. The average annual precipitation is 13 to 16 inches, the average annual air temperature is about 43° F, and the frost free period is 20 to 60 days.

In a representative profile the surface layer is black silty clay loam about 5 inches thick. The subsoil is very dark brown and dark grayish brown clay about 10 inches thick. Depth to partly consolidated volcanic tuff is about 15 inches.

Permeability is slow, available water capacity is 2 to 3 inches, and the water supplying capacity is 8 to 10 inches. Effective rooting depth is 10 to 20 inches.

These soils are used for range and wildlife habitat.

Representative profile of Fopiano silty clay loam, 2 to 15 percent slopes, east of road in the SW¼NW¼ section 3, T. 12 S., R. 26 E.:

A1—0 to 5 inches; black (10YR 2/1) silty clay loam, gray (10YR 5/1) dry; moderate medium platy and weak fine granular structure; slightly hard, friable, sticky and plastic; many very fine and fine roots; many very fine irregular pores; neutral (pH 6.6); abrupt smooth boundary; 4 to 10 inches thick.

B21t—5 to 11 inches; very dark brown (10YR 2/2) clay, dark gray (10YR 4/1) dry; strong medium prismatic structure parting to moderate medium blocky; very hard, firm, sticky and plastic; common very fine and fine roots; many very fine continuous pores; continuous pressure faces; neutral (pH 6.6); clear wavy boundary; 3 to 7 inches thick.

B22t—11 to 15 inches; very dark grayish brown (10YR 3/2) clay, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; very hard, firm, very sticky and very plastic; common very fine and fine roots; many very fine continuous pores; common moderately thick clay films; common pressure faces; 25 percent soft angular pebbles; neutral (pH 6.8); abrupt smooth boundary; 2 to 5 inches thick.

Cr—15 inches; partly consolidated rhyolitic tuff.

Depth to the partly consolidated volcanic tuff is 10 to 20 inches. The content of coarse fragments ranges from 0 to 25 percent throughout the profile. Colors throughout range in hue from 10YR to 7.5YR. In the A1 horizon value is 4 or 5 dry and chroma is 1 or 2. In the B2t horizon value is 2 or 3 moist and chroma is 2 or 3.

11C—Fopiano silty clay loam, 2 to 15 percent slopes. This soil is on undulating uplands. It has the profile described as representative of the series. Areas range from 100 to about 500 acres in size.

Included with this soil in mapping are areas of Waterbury soils, Gwin soils, and very shallow soils. These areas make up as much as 15 percent of the mapping unit. The Waterbury and Gwin soils are on short, generally south facing slopes.

Runoff is medium, and the hazard of erosion is moderate. Capability unit VIe; Clayey Terrace range site; wildlife group 4.

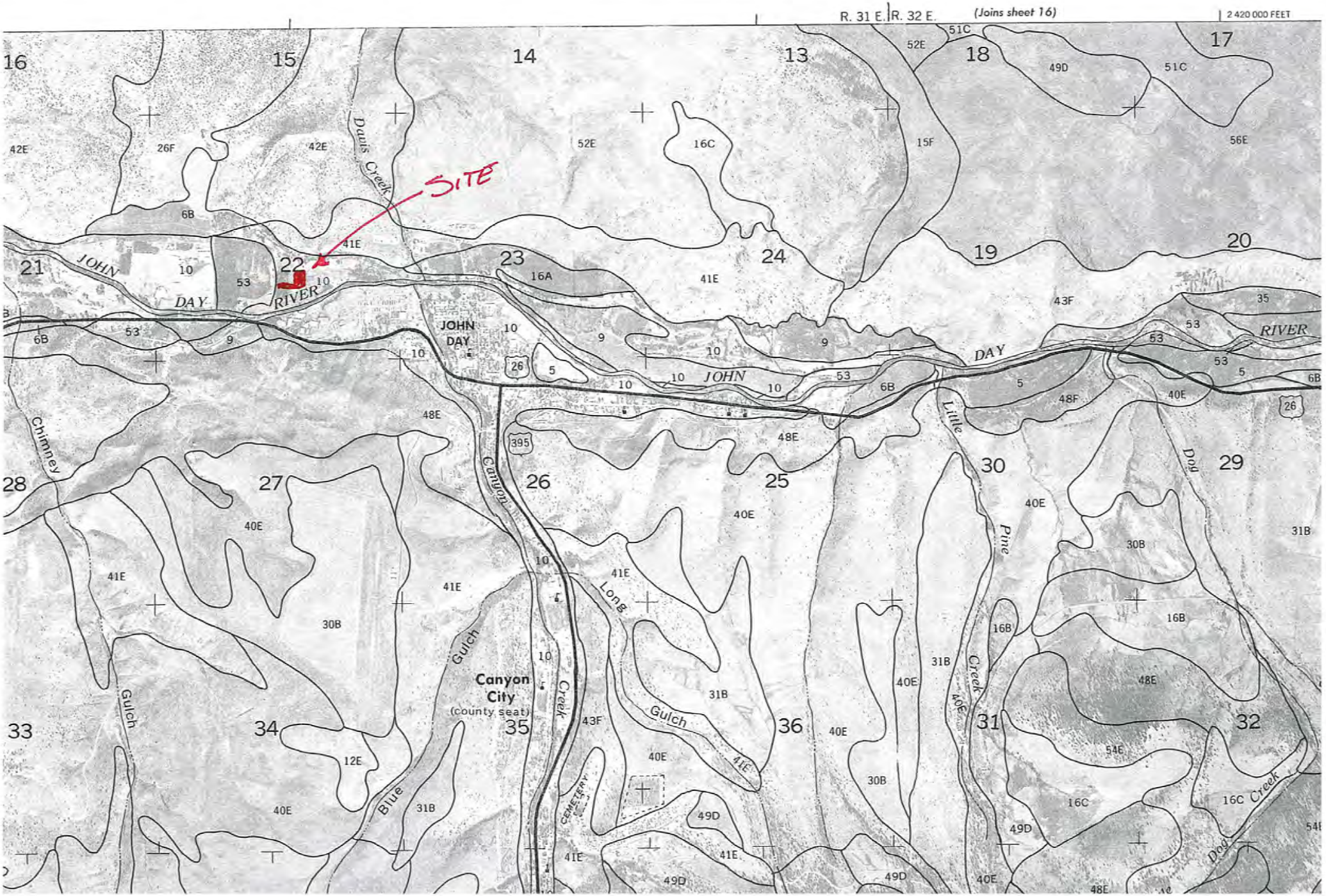
11E—Fopiano silty clay loam, 15 to 40 percent north slopes. This soil is on uplands. Areas range from 100 to about 500 acres in size.

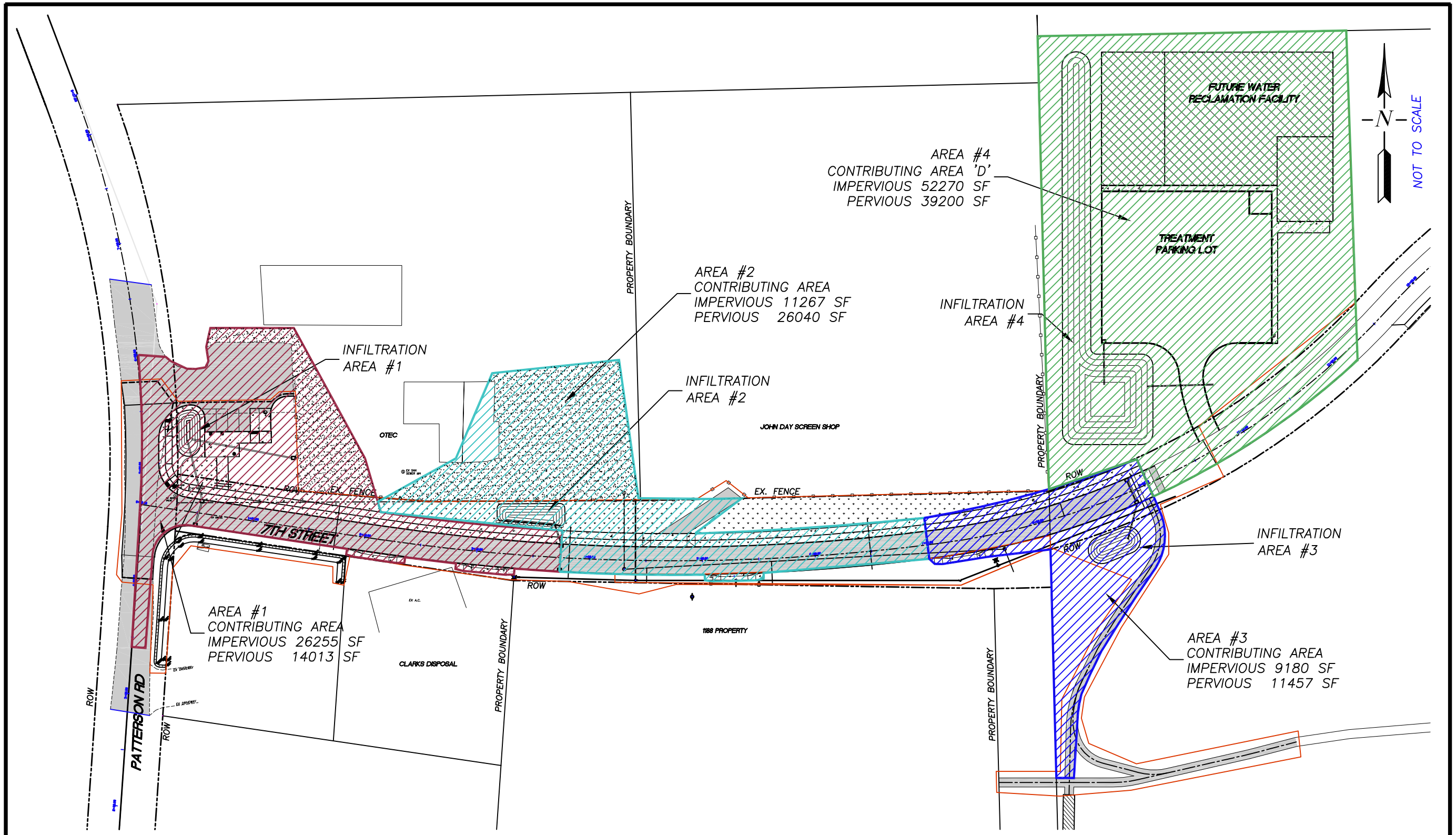
TABLE 14.—*Soil and*

[Absence of an entry indicates the feature is not

Soil name and map symbol	Hydrologic group	Flooding		High water table	
		Frequency	Months	Depth	Kind
				Ft	
Alding:					
[1] 1F:					
Alding part	D	None		>6.0	
Rock outcrop part					
Lithic Xerochrepts part	D	None		>6.0	
Anatone:					
[1] 2D:					
Anatone part	D	None		>6.0	
Wrightman part	C	None		>6.0	
Balder:					
3C, 4F	C	None		>6.0	
Boyce:					
5	B/D	Occasional	Dec.-Apr.	0.5–1.0	Apparent
Courtrock:					
6B	B	None		>6.0	
Daxty:					
7E	B	None		>6.0	
[1] 8E:					
Daxty part	B	None		>6.0	
Rock outcrop part					
Lithic Xerochrepts part	D	None		>6.0	
Dayville:					
9	C	Occasional	Dec.-Apr.	2.0–3.0	Apparent
Dumps:					
10					
Fopiano:					
11C, 11E	D	None		>6.0	
Grell:					
12E, 13E	D	None		>6.0	
Gwin:					
[1] 14E, [1] 14F:					
Gwin part	D	None		>6.0	
Rockly part	D	None		>6.0	
[1] 15F:					
Gwin part	D	None		>6.0	
Rock outcrop part					
Hack:					
16A, 16B, 16C, 17C, [1] 18D	B	None		>6.0	
Hankins:					
19E, 20E	C	None		>6.0	
Helter:					
21C, 21E, 21F	B	None		>6.0	
Laycock:					
[1] 22E, [1] 23E, [1] 23F:					
Laycock part	B	None		>6.0	
Logdell part	B	None		>6.0	
Lemonex:					
24E	C	None		>6.0	
[1] 25E:					
Lemonex part	C	None		>6.0	
Rock outcrop part					
Lithic Xerochrepts part	D	None		>6.0	

GRANT COUNTY, OREGON, CENTRAL PART — SHEET NUMBER 25





REVISIONS	BY

WASTEWATER TREATMENT FACILITY

CITY OF JOHN DAY

LAYOUT & CONTRIBUTING RUNOFF AREAS

SISUL ENGINEERING
158 E. MAIN STREET
JOHN DAY, OREGON
(541) 575-3777

DATE	JULY 2022
SCALE	1"=30'
DRAWN	GJB
JOB	08-001
SHEET	01
OF	01 SHEETS

City of John Day Wastewater Treatment Facility

Stormwater Maintenance and Inspection Plan

Feb 14th, 2023

Introduction:

The stormwater facilities as part of the development of the City of John Day Wastewater Treatment Facility will collect runoff from the facility, parking area, and the extension of 7th Street to access the site. The system includes collection of the runoff, routing and treatment of the runoff. The following is a guideline for the maintenance and inspection of the system.

This Plan shall be updated with any changes to the system or conditions under which it operates.

Responsibilities:

The City of John Day Public Works Department will perform all inspections and maintenance activities.

The Public Works Director is responsible for overseeing and insuring all inspections and maintenance is performed to properly operate the system.

Public Works Director: Casey Myers
Contact #: 541-620-3090
myersc@grantcounty-or.gov
450 E. Main Street
John Day, OR 97845

Minimum Inspection Activities:

Description	Frequency	Activity
Impervious Driving Surfaces	weekly	-inspect road and parking areas for trash, debris, and accumulation of dirt on the surface
Catch Basins	quarterly	-inspect catch basins for accumulation of oil/grease, trash, sediment, etc.
	weekly	-inspect catch basin grates and sumps for accumulation leaves and other debris more often in fall of the year
Piping	quarterly	-inspect piping for accumulation of sediment or other clogs while inspecting catch basins
Infiltration Areas	monthly	- inspect infiltration areas for weeds, trash and other debris
	per event	-after/during storm events inspect infiltration areas for any damage, infiltrating properly, accumulation of sediment.
	annually	-start of each growing season inspect plant health and survival.

City of John Day Public Works Department is to maintain a logbook for the Stormwater Maintenance and Inspections, all inspections and needed maintenance is to be logged, noting employee doing the inspection, date and

time, weather conditions and findings. Any maintenance activities needed are to be scheduled and addressed in a timely manner.

Typical Maintenance Activities:

Description	Frequency	Activity
Impervious Driving Surfaces	as needed twice per year (min)	-sweep surface and curb gutter lines with City's street sweeper to remove dirt, sanding gravel, debris, etc.
	as needed	-cleanup any oil/grease/fuel spills following proper cleanup methods and equipment per City's Emergency Response Plan
Catch Basins	twice per year (min)	-clean use City's Vac-Truck to remove oil/grease, sediment, trash, and other debris from catch basin
	as needed	-rack/remove leaves & debris from catch basin grates
Piping	as needed	-when cleaning catch basins if sediment or clogs are in piping use Vac-Truck and Jet-Rod to clean piping
Infiltration Areas	Monthly (typical)	- Manually weed area (do not use herbicides) Mow/Trim desired vegetation as need to maintain health and appearance of plantings
	yearly	'-inspect yearly for contaminate buildup, test if signs show contaminates (poor plant health, visual signs of oils, etc.)
	as needed	-remove trash and debris from area
	as needed	-during dry periods remove any buildup of sediment in the infiltration area. If area becomes "plugged" an will not infiltrate properly remove material and replace with new topsoil/mulch mixture
	as needed	- if original plants die off due to hard winter, drought, etc. to be replanted, watered, fertilized as needed to re-establish
Snow Storage	as needed	-When removing snow/ice from surfaces stockpile in location that will drain to or in infiltration area, taking care to not damage area/structures/plantings when shoving snow.

As part of the logbook for the Stormwater Maintenance and Inspections all maintenance activities are to be logged, noting employee(s) doing the maintenance, materials & equipment used, disposal location of cleanings, date and time, and weather conditions.

APPENDIX B

PROJECT AREA PHOTOGRAPHS

City of John Day Wastewater Treatment System Improvements Project

John Day, Oregon

Date: June 3, 2022

Photo 1:
View to the southwest of the proposed new WWTF site and surrounding area. Photograph was taken from a nearby hillside.

Date: June 3, 2022

Photo 2:
View to the northeast of current conditions at the proposed new WWTF site.

Date: June 3, 2022

Photo 3:
View of an infiltration testing site for the proposed subsurface infiltration galleries.

Date: June 3, 2022

Photo 4:
View to the northwest of current conditions at the proposed new WWTF site.

Date: June 3, 2022

Photo 5:
View to the south of the current conditions at the proposed new WWTF site.

Date: June 3, 2022

Photo 6:
View of conditions in Davis Creek just upstream of 7th Avenue where the new sewer pipeline will be bored under the creek. Not the lack of flow and degraded habitat conditions.

Date: June 3, 2022

Photo 7:
View of conditions in Davis Creek at the 7th Avenue crossing where the new sewer pipeline will be bored under the creek. Note the lack of flow and degraded habitat conditions.

Date: June 3, 2022

Photo 8:
View of conditions in Davis Creek downstream of the 7th Avenue crossing just upstream of the creek's confluence with the John Day River. Water in the creek channel is high flow backwater from the John Day River.

Date: June 3, 2022

Photo 9:
View to the southeast of the Canyon Creek confluence with the John Day River near the Action Area.

Date: June 3, 2022

Photo 10:
View to the north of a manhole used to access the sewer siphon that is located under the John Day River. The siphon will be rehabilitated during implementation of the proposed project by working from the manhole and inside the siphon, avoiding in-water work.

Date: June 3, 2022

Photo 11:

View to the east of a manhole used to access the sewer siphon that is located under the John Day River. The siphon will be rehabilitated during implementation of the proposed project by working from the manhole and inside the siphon, avoiding in-water work.

Date: June 3, 2022

Photo 12:

View to the east of the intersection of Patterson Bridge Road and 7th Avenue that will be paved.

Date: June 3, 2022

Photo 13:
View to the east of a part of 7th Avenue that will be paved and access the new WWTF.

Date: June 3, 2022

Photo 14:
View to the southwest of the City's existing WWTF.

Date: June 3, 2022

Photo 15:
View to the northwest of the City's existing WWTF.

Date: June 3, 2022

Photo 16:
View to the east (looking upstream) of the John Day River near the Action Area at the Patterson Bridge Road Bridge.

Date: June 3, 2022

Photo 17:

View to the west (looking downstream) of the John Day River near the Action Area at the Patterson Bridge Road Bridge.

APPENDIX C

Groundwater and Surface Water Monitoring Plans

City of John Day Wastewater Treatment System Improvements Project

John Day, Oregon

GROUNDWATER MONITORING PLAN - CITY OF JOHN DAY

Water Pollution Control Facility (WPCF) Permit #103281

Project No. 2111005
May 1, 2023

PREPARED FOR:

City of John Day
Rick Allen, Interim City Manager
450 East Main Street
John Day, OR 97845

CwM-H2O
Complete Water Management

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1 Introduction

OAR 340-040-0030(2)(a)

This document presents the Groundwater Monitoring Plan (Plan) for the City of John Day's (City) municipal wastewater treatment and disposal system as required by OAR 340-040-0030. The City operates and maintains its municipal wastewater system under the authority granted by Oregon Department of Environmental Quality (DEQ) Water Pollution Control Facilities (WPCF) Permit #103281 (see Appendix A for a copy of the Permit). This Permit was issued by DEQ pursuant to ORS 468B.050 on April 18, 2022 with an effective date of May 1, 2022.

This Plan is organized into four main sections generally configured to match the requirements of OAR 340-040-0030 for Groundwater Quality Protection – Permitted Operations. The sections of this report are:

- **Section 1** – Introduction (OAR 340-040-0030(2)(a))
- **Section 2** – Groundwater Monitoring System Design (OAR 340-040-0030(2)(a)(A))
- **Section 3** – Sample Collection and Analysis Program (OAR 340-040-0030(2)(a)(B))
- **Section 4** – Data Analysis and Reporting Procedures (OAR 340-040-0030(2)(a)(C))

1.1 Purpose and Goals

The purpose of this Plan is to present the groundwater monitoring activities proposed by the City to meet the conditions of WPCF Permit #103281 (Permit). The Permit is for the City's updated treatment facility consisting of sequencing batch reactors, tertiary filtration, and UV disinfection. Treated wastewater will then either be utilized for beneficial reuse purposes through the City's proposed purple-pile network or discharged to a subsurface rapid infiltration gallery system.

This Plan meets the following objectives:

- Develop a groundwater monitoring well network to observe groundwater conditions in the alluvial aquifer up-gradient and down-gradient of the City's wastewater infiltration system,
- Provide a design for the groundwater monitoring wells and determine installation procedures that are in accordance with DEQ and Oregon Water Resources Department (OWRD) rules and regulations,
- Define a sampling schedule and sampling procedures,
- Identify the equipment necessary for sampling and data collection,
- Determine quality assurance and quality control measures for both field and laboratory testing,
- Provide field reporting and annual reporting requirements.

1.2 Proposed Wastewater Treatment System – Permit #103281

The City's WPCF Permit #103281 is related to a new WWTP facility, which will be comprised of membrane bioreactor, mechanical, and aerobic digestion treatment with options for both treated wastewater reuse and for disposal through subsurface infiltration trenches. Collected wastewater will be diverted through an oversized pipe around the City's current WWTP and percolation ponds westward, where it will enter into the new WWTP headworks (Figure 1 - Permitted WWTP Facilities and Proposed Groundwater Monitoring Network). The oversized pipeline will provide some flow equalization capabilities. The headworks will consist of screens for grit removal and large solids reduction. Influent pumps will push the screened wastewater through an influent meter device and into one of two packaged membrane bioreactor (MBR) trains. Each train

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Figure 1
WWTP Facilities and Proposed Groundwater Monitoring Network

No.	Date	By	Revisions
1	DATE	AUTH	DRAFT

0 250 500 1,000 ft

1" = 500'

Proj#: 2111005
CJD Monitoring Plans

City of John Day

N

Alluvial Aquifer Boundary

Proposed Monitoring Wells

will consist of an anaerobic basin, anoxic basin, and pre-aeration basin, a feed-forward pump, and an MBR basin with membrane cassettes to form filtered permeate liquid.

Permeate liquid will then be fed to either a hydroponic treatment system, a potential tertiary treatment system, or through UV disinfections systems. Water that passes through the UV disinfection will be stored temporarily in a recycled water reservoir. Recycled water will either be pumped into the City's purple-pipe network for beneficial reuse or, when reuse demand does not meet treated wastewater production, will be sent to the subsurface infiltration gallery system (Figure 1).

As described in Section 2, the permitted WWTP will have a groundwater network consisting of one up-gradient (background) monitoring well, one down-gradient (detection) monitoring well, and three down-gradient (compliance-point) monitoring wells (Figure 1).

2 Groundwater Monitoring System Design

OAR 340-040-0030(2)(a)(A)

This Plan meets the State's Groundwater Quality Protection rules (OAR 340-040) by protecting the uppermost aquifer and other aquifers affected by the proposed WWTP activities. The Plan accomplishes this by proposing a monitoring system sufficient to determine the rate and direction of groundwater movement in the affected aquifer(s) and groundwater quality monitoring up- and down-gradient from the proposed waste management area.

The subsurface infiltration system introduces the treated wastewater effluent to the uppermost aquifer system, the shallow alluvial aquifer of the John Day River Valley. The alluvial aquifer is the only impacted aquifer system identified in the CwM-H2O, LLC (CwM) Hydrogeologic Investigation report (CwM, 2021). The groundwater monitoring network for the new WWTP facility is therefore designed to monitor groundwater level and groundwater quality in the alluvial aquifer.

The alluvial aquifer ranges from just a few feet thick along the John Day valley walls to up to 50-ft thick in some areas at the center of the valley. Native alluvial deposits in the John Day Valley consist of relatively compacted silts and sands interspersed with gravels and cobbles. Large-scale dredging in the late 19th and early 20th centuries transformed the alluvial aquifer around the City by washing away most of the fine sediment and redepositing the rest. Dredged areas now consist primarily of sandy gravel and cobbles. Patches of silty sand can be found where dredge ponds were constructed or where finer sediments settled out of the tailings.

The John Day River acts as a hydrologic divide in the shallow alluvial aquifer. Because of the hydraulic influence of the river on local groundwater flow, only the alluvial aquifer north of the river will be impacted by the activities performed under the WPCF Permit.

2.1.1 Groundwater Recharge, Flow, and Discharge

The permitted WWTP facility is located in an oblong section of the alluvial aquifer, bounded on the north by bedrock of the valley wall and to the south by the John Day River. The river's channel flows up against the valley wall to the west and east of the WWTP, pinching out the alluvial aquifer and creating a flow-through groundwater system (Figure 2 - Groundwater Flow in the Alluvial Aquifer System). The confluence of Davis Creek (flows from the north) and Canyon Creek (from the south) with the John Day River marks the up-gradient end of the section of the alluvial aquifer in which the WWTP is situated.

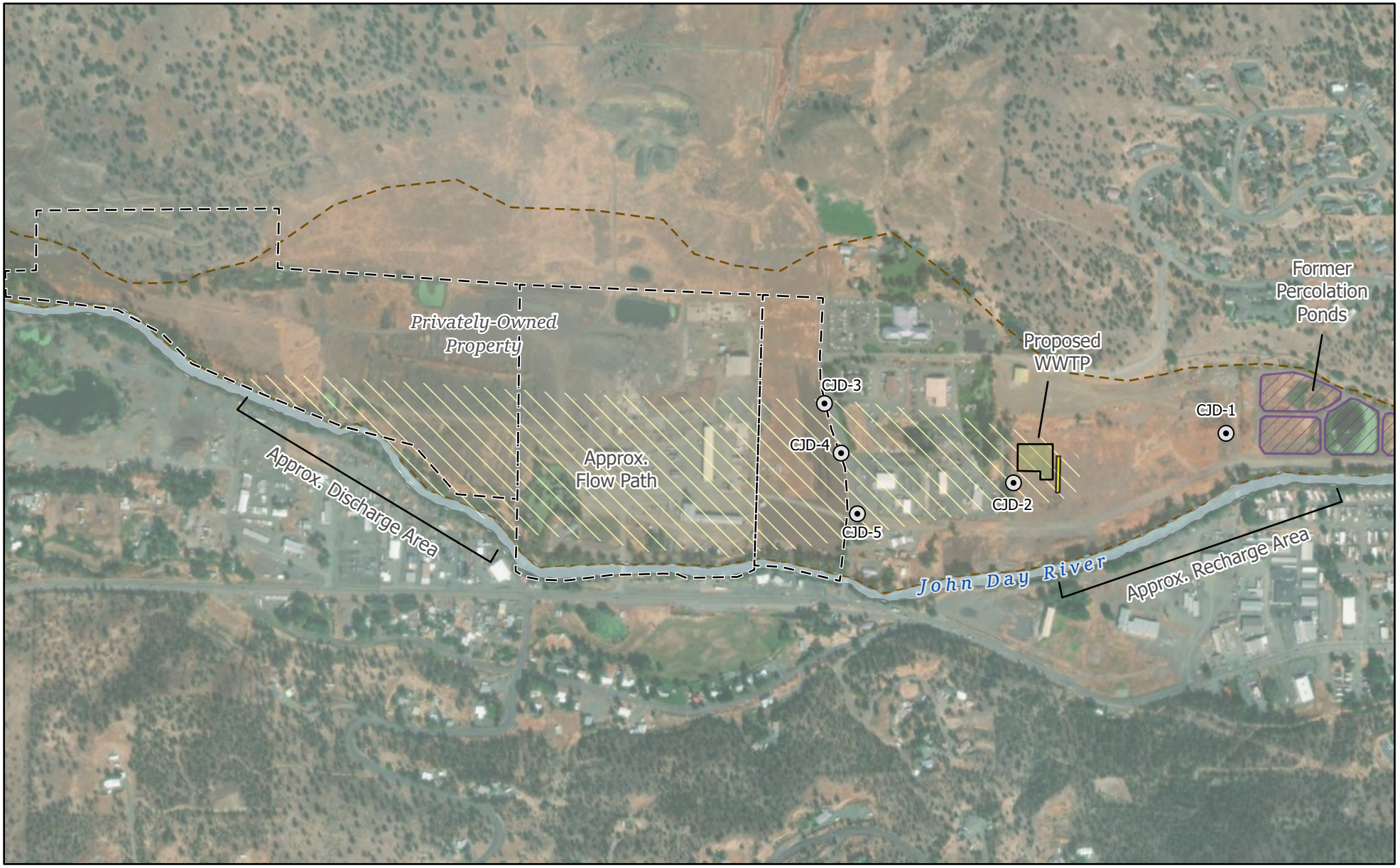

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Figure 2
Groundwater Flow in the Alluvial Aquifer System

No.	Date	By	Revisions
1	DATE	AUTH	DRAFT

0 375 750 1,500 ft

1" = 750'

Proj#: 2111005
CJD Monitoring Plans

City of John Day

N

- Alluvial Aquifer Boundary
- Private Land Down-gradient
- Proposed Monitoring Wells

The John Day River recharges the alluvial aquifer in its losing reach upstream (east) of the proposed WWTP. Groundwater flows through the alluvial aquifer from east to west. The groundwater gradient in the aquifer generally follows the gradient of the river and the gradual slope of the valley to the west. Groundwater discharges from the aquifer back to the John Day River channel towards the western terminus of the alluvial deposits north of the river (CwM, 2021).

Treated wastewater that is infiltrated into the alluvial aquifer will percolate downward to the saturated zone before flowing down-gradient to the west (Figure 2). Groundwater modeling of the subsurface infiltration gallery system indicated that the bulk of the infiltrated water will discharge to the river over more than 100 m of riverbank approximately 1 km downstream of the WWTP facility under average river conditions (CwM, 2021). Modeling suggests that when river levels are very low, infiltrated water may discharge to the river over a more up-stream reach. Conversely, when river levels are very high, such as in the spring snowmelt season, infiltrated water is pushed further downgradient before discharging to the river. The results of the hydrogeologic site investigation and groundwater modeling study were used to guide site selection for the groundwater monitoring wells.

2.2 Proposed Groundwater Monitoring Wells

OAR 340-040-0030(2)(a)(A)

As part of the State's Groundwater Quality Protection rules (OAR 340-040), the Plan includes:

- Background Monitoring Point(s) – located up-gradient of and unaffected by the WPCF facility operations (CJD-1)
- Down-gradient Detection Point(s) – located immediately down-gradient from the waste release point, or the proposed infiltration point (CJD-2)
- Compliance Point(s) – a location specified by the Department at which water quality parameters must be at or below concentration limits defined by the Permit (CJD-3, CJD-4, and CJD-5)

2.2.1 Monitoring Well Placement

OAR 340-040-0030(2)(a)(A)(i)

The City proposes a total of five groundwater monitoring points (CJD-1 through CJD-5), all of which will be newly constructed, dedicated groundwater monitoring wells. All monitoring wells will be constructed to observe conditions in the affected alluvial aquifer of the John Day River Valley. CJD-1 will be located up-gradient (east), CJD-2 will be located immediately down-gradient (west), and three wells (CJD-3 through CJD-5) will be located down-gradient in the flow field (Figures 1 & 2). The monitoring roles of these wells are discussed further in Section 2.2.3.

2.2.2 Monitoring Well Design and Construction

OAR 340-040-0030(2)(a)(A)(ii)

Construction of the groundwater monitoring wells will be completed in accordance with the current industry best practices, Oregon Water Resources Department (OWRD) rules for the construction of monitoring wells

(OAR Division 690, Chapter 240), and the Oregon Department of Environmental Quality guidance. Technical specifications for groundwater monitoring well construction are included in Appendix B.

Based on field observations from previous site investigations (CwM, 2021), the groundwater monitoring wells will have the following general design components, adjusted as needed during construction to match geologic conditions observed in the field (Appendix B):

- Total depth of about 25 ft bgs to fully penetrate the alluvial aquifer deposits.
- 2" diameter Sch. 40 PVC casing from surface to about 8-10 ft bgs.
- 2" slotted Sch. 40 PVC screen interval from about 8-10 ft bgs to the bottom of the well.
- A 6" unslotted section of Sch. 40 PVC casing will be placed at the bottom of the well to act as a sump.
- Minimum 2" annular space filled with coarse sand (12/20) filter pack from the bottom to 2 ft above the top of the screen, or approximately 6 ft bgs.
- Minimum 2" annular space filled with hydrated bentonite chips from the surface to the top of the filter pack, or approximately 6 ft bgs, for a surface seal.
- A 3 ft x 3 ft concrete well pad at the surface with 3 ft of casing stickup within a protective metal casing. Three cement-filled protective bollards will be placed around the well, or
- A flush-mounted well casing vault set in a concrete apron with sloping surface.

The City's new monitoring wells will be surveyed after construction is completed to accurately determine their horizontal location, adjacent ground surface elevation, and measurement point (top of casing) elevations (Appendix B). Once the monitoring points are surveyed in, regular groundwater level readings can be used to calculate groundwater contours and flow direction. An example Well Drilling and Construction Log form is included in Appendix C.

2.2.3 Background, Detection, and Compliance Monitoring Points

OAR 340-040-0030(2)(a)(A)(iii-v)

The City proposes to construct and maintain five groundwater monitoring wells dedicated to the new WWTP facility. The locations of the monitoring wells and proposed infiltration point are shown in Figure 1. The upgradient or background monitoring well (CJD-1) will be located about 800-900 ft east of the proposed infiltration trenches (Figures 1 & 2). At this distance, CJD-1 will be outside of the expected area of influence created by mounding under the infiltration system. The upgradient well location is near where the John Day River bends to the south, away from the northern valley wall. At this location, the river is typically under losing conditions and is contributing to the alluvial aquifer.

One detection point well (CJD-2) will be constructed immediately downgradient of the treated wastewater infiltration systems. The monitoring wells are intended to function as background condition collection points and ongoing monitoring points during WWTP operations. The proposed location of CJD-2 is about 200 ft directly west (downgradient) from the center of the infiltration trench (Figures 1 & 2).

Compliance-point wells CJD-3, CJD-4, and CJD-5 will be distributed north to south along Patterson Bridge Road, approximately 1,100 – 1,400 ft down-gradient of the infiltration systems to capture the width of the expected groundwater flow path (Figure 2). The final locations may change by up to 100 ft from the points shown in Figures 2 and 4 depending on utility locates and roadway improvement activities.

2.2.4 Monitoring Well Development

OAR 340-040-0030(2)(a)(A)(ii)

Development of the newly constructed monitoring wells will be required. Each well will be developed within two days following the placement of the casing, filter pack, and surface seal. The driller will be responsible for removing cuttings or other debris from the well casing prior to development. Development will first consist of bailing down the wells and surging the screened interval with a 2" surge block. Development will be completed by pumping from the wells with an electric submersible pump capable of purging the wells at about 3-5 gallons per minute (gpm).

A minimum of 20 well volumes will be purged from each well while temperature, pH, and electrical conductivity are measured for stability. Groundwater quality will be considered stable when temperature remains within about 0.1°C, pH within about 0.1 units, and conductivity within about 5%. Once groundwater parameters have stabilized and at least 50 well volumes have been removed, the well is considered developed. Visual clarity or turbidity of the water will not be used as a development parameter because the groundwater in the alluvial aquifer is known to be naturally highly turbid in some areas. An example Well Development field form is included in Appendix C.

2.2.5 Monitoring Well Decommissioning or Abandonment

Well decommissioning or abandonment may become necessary due to construction issues, poor maintenance, well failure, or unexpected environmental contamination. Due to the shallow depth of the proposed wells, the preferred method for decommissioning is to pull the well casing and screen and backfill the hole with cement grout, bentonite grout, or concrete. However, extracting PVC casing can result in breakage below the surface. If decommissioning is found to be necessary, decommissioning procedures will conform to the OWRD rules (OAR Division 690, Chapter 240) and DEQ guidance documents.

2.2.6 Monitoring Well Installation Schedule

The City proposes to install the monitoring wells after the Groundwater Monitoring Plan is finalized and the DEQ approves the plan. The City intends to install all proposed monitoring wells so they are in place and collecting background data prior to constructing the new WWTP facility. Quarterly sampling and background monitoring activities would ideally begin in the summer or fall of 2023 or as soon as the monitoring wells are installed and approved for their intended use.

3 Sample Collection and Analysis Program

OAR 340-040-0030(2)(a)(B)

The City will monitor and sample the five monitoring wells on a quarterly basis in accordance with WPCF Permit #103281 requirements. The City will perform quarterly sampling at approximately the following dates:

- Q1 Event: Second week of March (reporting by April 15)
- Q2 Event: Second week of June (reporting by July 15)
- Q3 Event: Second week of September (reporting by October 15)
- Q4 Event: Second week of December (reporting by January 15)

The following section describes the Sampling and Analysis Program (SAP) procedures to be used for groundwater monitoring at the City's wastewater treatment facilities. The goal of the SAP is to produce accurate, reliable, and robust groundwater quality data to maintain compliance with the WPCF Permit conditions. The SAP describes procedures involved with the following processes:

- Well assessment prior to purging,
- Groundwater sampling procedures,
- Equipment decontamination procedures,
- Sample packing and shipping,
- Analytical laboratory procedures,
- Record keeping and chain of custody (COC),
- Quality assurance.

3.1 Monitoring and Sampling Parameters

OAR 340-040-0030(2)(a)(B)(i)

The groundwater quality parameters required by the WPCF Permit are shown in Table 1. During each quarterly event, each groundwater monitoring well will be purged (Section 3.3.5) and sampled (Section 3.3.6). The analytical parameters listed in Table 1 will be measured or included in sample analyses as required by the City's WPCF Permit. All wells will be sampled on the same day to avoid variation from environmental factors.

Table 1 – Required Groundwater Quality Monitoring Parameters

Parameter	Minimum Frequency	Sampling Type	Reporting
Dissolved Oxygen (DO)	Quarterly	Field Measurement	Annually
Oxidation-reduction Potential (ORP)			
pH			
Turbidity			
Temperature			
Total Suspended Solids (TSS)		Grab Sample (Lab Measurement)	
Total Dissolved Solids (TDS)			
Biological Oxygen Demand (BOD5)			
Total Nitrogen			
E. coli			
Total Phosphorus			

3.2 Sampling Frequency and Duration

OAR 340-040-0030(2)(a)(B)(ii)

Groundwater samples will be collected, at minimum, on a quarterly basis as required by the City's WPCF Permit (Table 1). It is understood that quarterly sampling will continue unless the City presents data to the DEQ supporting a reduction in the groundwater sampling frequency. The groundwater sampling program will continue for the duration of the WPCF Permit.

Groundwater samples from all four monitoring wells will be collected on the same day. Field-measured parameters will be measured at the well site, not at a later time from collected samples.

3.3 Monitoring and Sample Collection Methods

OAR 340-040-0030(2)(a)(B)(iii)

The following section outlines the procedures that will be used to record groundwater conditions in the field, prepare the monitoring wells for sampling, collect groundwater samples, and transport the samples to the lab for testing.

3.3.1 Field Recording and Documentation

Observations and actions during quarterly monitoring and sampling events will be recorded in daily activity logs, well inspection logs, and purging and sampling logs. Example field forms have been prepared for use by City staff during sampling events (see examples in Appendix C). Forms will be duplicated and stored in digital and physical copies at the City WWTP office.

3.3.2 Instrument Care and Calibration

Five groundwater parameters will be regularly measured in the field using portable field meters: temperature, pH, conductivity, turbidity, and ORP. Field thermometers do not require regular calibration. The probes used to measure pH, conductivity, ORP, and turbidity will be calibrated within no more than 48 hours of the sampling event. Calibration of field meters will follow the manufacturer's recommendations and frequencies and will be used in compliance with operating instructions and decontamination procedures. All field measurement and sampling equipment will be decontaminated after each use.

3.3.3 Equipment Decontamination Procedures

In order to minimize the chances of cross-contamination, equipment must be appropriately cleaned in between sampling events and well sites. Non-dedicated equipment, such as water level meters used for various sites and applications, should be decontaminated before and after use for the groundwater monitoring program. Equipment dedicated to use for groundwater monitoring of the WPCF Permit sites will be prioritized to further reduce cross-contamination risk.

Non-dedicated equipment used for measurement but not involved in sampling (water level meter, field probes, etc.) will be decontaminated between sampling events using the following procedure:

- Wipe with a clean paper towel,
- Rinse with potable water,
- Wash with a lab-grade detergent such as Alconox,
- Rinse with distilled water.

Non-dedicated equipment used for sampling (submersible pump, tubing, etc.) will be decontaminated between sampling events using the following procedure:

- Wipe with a clean paper towel,
- Rinse with potable water,

- Cycle water with a lab-grade detergent, such as Alconox through the pump and sample tubing,
- Scrub to remove dirt and debris,
- Rinse with distilled water.
- Cycle distilled water through the pump and tubing.

3.3.4 Proposed Field Measurement Equipment

The City is aware of the field monitoring and sampling equipment requirements to carry out the proposed groundwater monitoring program. A list of required sampling equipment and proposed field monitoring equipment is included in Appendix D.

3.3.5 Well Purging

Field personnel will complete a general inspection of each monitoring well before each sample event. The visual inspection will generally consist of checking the above-ground casing for weather damage, evidence of tampering, deterioration, or entry of animals into the casing. The results of the inspection will be recorded on the Well Inspection form (Appendix C).

A minimum of 10 well volumes will be purged from the well casing before groundwater samples are collected. Field personnel will determine the well volume before each sampling event by taking a depth measurement accurate to 0.01 ft and applying the formula below with the known well construction details.

$$V = 0.041 \times D^2 \times H$$

V is one well volume in gallons
D is the well diameter in inches
H is the length of the water column in feet *(depth of well + measurement point height – depth to water)*

Given the shallow depth of the alluvial aquifer (15-25 ft) and the diameter of the proposed monitoring wells (2”), one well volume will generally be between 1.0 and 2.0 gallons, and is unlikely to exceed 3.0 gallons. The wells should be purged before sampling at a low rate of <2 gpm if possible. During purging, the field personnel will measure temperature, pH, and electrical conductivity regularly to determine when groundwater quality stabilizes. A depth-to-groundwater measurement will be collected each time field parameters are recorded.

The volume purged from each well, the water quality parameters, and the depth to groundwater in the well will be recorded on a well purging sheet accompanying each groundwater sample data sheet (Appendix C). Samples will be collected after at least 10 well volumes have been pumped and parameters have stabilized. The same pump will be used for both purging the well and collecting groundwater samples. A final temperature, pH, and conductivity reading will be collected at the time of sampling.

3.3.6 Sample Collection

Groundwater samples will be collected from the discharge tube of the sampling pump directly into new, clean sampling bottles provided by the testing laboratory. Samples should not be transferred from one sample container to another to avoid cross-contamination and aeration of the sample. Samples will be collected without touching the bottle to the end of the discharge tube and in a manner that reduces the risk of sample contamination, including:

- Collecting samples as soon as possible after the well is purged.

- Collecting samples at a flow rate equivalent to or less than the rated used to purge the well.
- Avoiding aeration of water by dropping pump equipment into the well or agitating the water column's surface within the well.
- Opening the sample bottles only immediately before the sample is collected.
- Minimizing agitation of the sample bottles once placed in the transport container.

Each sample bottle will have a label containing the following information in permanent marker:

- Well site number,
- Sample ID number,
- Date and time of collection,
- Sampler's initials,
- Analytical lab receiving the samples.

The personnel collecting the samples will enter matching information on the Monitoring Well Sampling field form and the chain-of-custody (COC) form (Appendix C). A lab-provided COC form will also be filled out and included with the samples in the transport container. Once the samples are collected and stored, the well will be secured. Sample handling and COC procedures are discussed further in Section 3.5.1.

Additional Quality Control samples will be collected during each sampling event. These samples are described in Section 3.5.2.

3.4 Analytical Methods

OAR 340-040-0030(2)(a)(B)(v)

The following section describes the analytical methods proposed for use in the groundwater sampling program. Multiple methodologies may be listed for one parameter. The laboratories under consideration by the City offer different or multiple analytical methods that are commonly applied in environmental monitoring.

3.4.1 Laboratory Methodologies

The proposed analytical methods for laboratory-tested groundwater samples are listed in Table 2.

Table 2 – Analytical Methods for Required Groundwater Monitoring Parameters

Required Groundwater Testing Parameter	Analytical Method(s) Proposed	Sample Holding Time
Total Suspended Solids (TSS)	SM 2450 D / I-3765-85	7 Days
Total Dissolved Solids (TDS)	SM 2540 C	7 Days
Biological Oxygen Demand (BOD_5)	SM 5210 B	24 Hours
Total Nitrogen (Total-N)	SM 4500-Norg B / EPA 300.0	7 Days / 48 Hours
Total Phosphorus (Total-P)	SM 4500 P F	48 Hours
E. Coli	SM 9223 B	24 Hours

**Based on data from the National Environmental Methods Index*

3.5 Quality Assurance and Quality Control

OAR 340-040-0030(2)(a)(B)(vii)

The following section outlines the steps taken in the groundwater monitoring program to ensure data quality from samples delivered to the analytical laboratory.

3.5.1 Sample Handling and Chain of Custody

OAR 340-040-0030(2)(a)(B)(iv)

Possession and transport of groundwater samples will be traceable from the time of sample collection in the field to the receiving laboratory. Documentation begins at sample collection with proper labeling on sampling containers, annotation on field forms, and by filling out a laboratory-supplied COC form. The COC forms will be included with the sample bottles in the transport container.

Groundwater samples that are sent to an analytical laboratory for analysis will be placed in a cooler containing ice or ice packs to maintain a maximum sample temperature of 4°C. Once sample bottles are sealed in the field, they will not be reopened until they are received at the lab and are processed for analysis. The sample cooler will be transported to the receiving laboratory on the same day as the samples are collected.

3.5.2 Quality Control Sampling

In addition to groundwater samples from the four monitoring wells, two additional Quality control and quality assurance (QA/QC) samples will be collected and analyzed for the analytical parameters. The QA/QC samples are meant to assess the variability introduced in sampling, handling, and analysis. One of each of the following sample types will be collected during each quarterly sampling event:

- Groundwater Duplicate – One well will be randomly selected during each quarterly sampling event. A duplicate groundwater sample will be collected from that well at the same time as the primary sample and will be labeled as a duplicate. The sample will be processed and tested at the lab along with the other groundwater samples. The duplicate sample provides information on laboratory analysis variability.
- Field Blank – One field blank will be collected during each quarterly sampling event. The field blank will be a sample bottle filled with distilled water at a randomly selected well site. The blank sample will be labeled as such and will be processed and tested at the lab along with the groundwater samples. The field blank provides information on potential environmental contamination due to ambient conditions.

3.5.3 Laboratory Quality Assurance

The laboratory selected and used for analytical testing will follow the current National Environmental Laboratory Accreditation Program standards and carry accreditation from the State of Oregon through their environmental laboratory accreditation program.

The City intends to utilize the services of either Umpqua Research Laboratory in Bend, OR (accreditation #OR100052) or Edge Analytical Laboratory in Bend, OR (accreditation #4075-007) for the analysis of regular groundwater samples.

4 Data Analysis and Reporting Procedures

OAR 340-040-0030(2)(a)(C)

The Oregon DEQ requires that groundwater monitoring reports and testing results be submitted by the 15th day of the month following the end of the quarter. Like with sampling events, the City will stive to submit groundwater monitoring reports to the DEQ on a regular schedule and within this due date. Each quarter's monitoring report shall present the groundwater monitoring activities performed at the City's WWTP facilities. All reports will be prepared in compliance with the groundwater monitoring requirements of the City's WPCF Permit and this Groundwater Monitoring Plan (PLAN). The reports will be submitted to the DEQ contact person, provided by the DEQ, in an appropriate digital format.

4.1 Statistical Analysis

OAR 340-040-0030(2)(a)(C)

Quarterly groundwater monitoring reports will include information on the condition of the monitoring points, parameters measured in the field and analyzed in the lab, notes on sample collection and handling activities, and a map of the monitoring network. Reports will also include numerical and graphical presentations of water level and water quality data. Copies of the original lab reports will be included in reports as appendices.

Analytical methods applied to groundwater reporting will change over time as more data points become available. For example, performing most statistical analysis will not be possible until at least four quarters of data are collected. However, early monitoring data will be compared to available background data collected from the wells prior to WWTP operations and will be discussed in the contact of establishing baseline water quality ranges for each parameter.

4.1.1 Analytical Methods & Frequency of Analysis

OAR 340-040-0030(2)(a)(C)(i-ii)

The water quality values measured in the field and laboratory during each quarterly sampling event will be compared to the mean or median (dependent on normality) and overall range of all previous measurements for that parameter. After at least four quarters of data are available, a ***Shapiro-Wilkes*** analysis will be used to determine if sampling data are normal. Parameters exhibiting a normal distribution will be compared by mean, while non-parametric datasets will be compared by median. Early sampling data is assumed to be non-parametric and will be compared by median.

Each quarter's data will be compared to past and concurrent data in multiple ways. For example, the TDS value for a given well and sampling event will be evaluated by:

- Comparing the value to all background data,
- Comparing the value to all previous post-background sampling values across all sites,
- Comparing the value to all previous values from the same position in the flow field (including other up- or down-gradient sites),
- Comparing the value to all previous values at that exact sampling site,
- Comparing the value to all previous data from that sampling quarter (seasonal comparison),
- Comparing the value to values from other sites during that sampling event.

Evaluating the data as stated above will allow the City to identify continuous trends, seasonal trends, spatial trends, and outlier events in water quality. Outlier events will be identified by performing a ***one sample t-test*** or similar statistical analysis to determine if a value is significantly different than the previously measured values. Once enough data are collected, groundwater level and water quality values will be analyzed on a time-scale basis. Simple linear regression or similar statistical analyses will be applied to determine if there are long-term temporal trends.

The required groundwater quality parameters which correspond to defined effluent limits at Outfall 001 in the Permit are listed in Table 3. Values of these parameters will be compared to the monthly and single event sampling maximums from the Permit. Any events that exceed the corresponding limit will be flagged in quarterly reports.

Table 3 - Permit Limits for Outfall 001 (Rapid Infiltration Basins)

Parameter	Unit	Monthly Average	Single Sample Maximum
BOD_5	PPM	20	-
TSS	PPM	20	-
Total Nitrogen	PPM	5	9
E. Coli	Organisms/100mL	126 (geometric mean)	406
pH	SU	6.5-8.5	6.5-8.5

**Monthly sampling is required at the outfall point. It is understood that groundwater compliance points will be held to the same effluent limits as Outfall 001. However, sampling is only required at a quarterly frequency at groundwater monitoring points.*

Each report will identify instances where parameters have increased significantly since the previous measurement, above the previous average value, or if a parameter exceeds the permit-specific concentration. Reports will also discuss the results of QA/QC samples by comparing the duplicate sample and field blank to the other groundwater samples.

Statistical analysis of groundwater sampling data will be performed on a quarterly basis following sample collection and analysis.

APPENDIX A

CITY OF JOHN DAY WPCF PERMIT

Oregon
Tina Kotek, Governor

Department of Environmental Quality
Eastern Region Pendleton Office
800 SE Emigrant Ave., Ste. 330
Pendleton, OR 97801
541-276-4063

March 13, 2023

Casey Myers
City of John Day
450 E Main Street
John Day, OR 97845
myersc@grantcounty-or.gov

RE: Modification #1 Issuance of WPCF-DOM-C2a Permit # 103281
File # 127619
Facility: John Day Wastewater Treatment Facility, 700 NW 7th Ave., John Day
Grant County

This permit is issued based on the land use findings in the permit record. This minor modification was initiated to include updates to Schedule B of the permit.

Your Water Pollution Control Facilities Permit has been modified and is enclosed. Your permit modification is effective on March 13, 2023.

Please read your permit carefully and reference both your permit and permit modification to ensure compliance and reporting obligations are met. Compliance with your permit is required at all times.

If you are dissatisfied with the conditions of this permit, you have 20 days to request a hearing before the Environmental Quality Commission or its authorized representative. A request for a hearing must be made in writing and state the grounds for the request. Any hearing will be conducted as a contested case hearing in accordance with ORS 183.413 through 183.470 and OAR chapter 340, division 011. If a hearing is requested, the existing permit continues in effect until a final order is issued.

Please contact your permit inspector, Justin Sterger, at: justin.sterger@deq.oregon.gov or 541-633-2016 if you have any questions about your permit requirements.

Sincerely,

Mike Hiatt
Water Quality Manager
Eastern Region

MH:pi

Attached: Permit Modification #1, Permit Modification #1 Fact Sheet
cc: Regional File, Pendleton DEQ
ec: DEQ Data Team, DEQ w/permit
ORMS

State of Oregon
Department of
Environmental
Quality

Water Pollution Control Facility
Permit Fact Sheet – Modification #1
City of John Day

Permittee	City of John Day John Day 450 East Main John Day, OR 97845
Existing Permit Information	File Number: 127619 Referenced F43569 Permit Number:103281 Referenced P102481 Category: Domestic Class: Minor Expiration Date: March 31, 2032
Permittee Contact	Casey Myers – Public Works Director myersc@grantcounty-or.gov 541-620-3090 450 East Main St. John Day, OR 97845
Nearest Water Waterbody	Water Body Name: John Day River River Mile: 248.0 Sub Basin Name: Upper John Day Basin Name: John Day
Proposed Action	Minor WPCF Permit Modification
Permit Writer	Justin Sterger 541-633-2016 Date Prepared: March 2023

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WPCF Permit Fact Sheet – Modification #1
City of John Day

1. Introduction

The Oregon Department of Environmental Quality (DEQ) proposes to modify the Water Pollution Control Facilities (WPCF) permit for the City of John Day wastewater treatment facility located at 700 NW 7th Avenue in John Day, OR 97845. The assigned permit allows and regulates the treatment and discharge of domestic wastewater from a new treatment plant (sequencing batch reactor with ultraviolet disinfection) to rapid infiltration basins.

The purpose of this fact sheet is to explain and provide justification for the proposed modifications to the existing permit.

2. Permit History

WPCF Permit #103281 was issued to the facility on April 18th, 2022 and the permit went into effect on May 1, 2022. The facility has not yet been constructed at the time of this permit modification.

The purpose of the permit modification is to complete minor typographical edits in the permit regarding required dates of collection of groundwater and surface water data and submittal of monthly reports after the new facility is constructed.

3. Proposed Permit Modification

This permit modification was based upon a request for clarification in start dates for surface water monitoring and groundwater monitoring as the permittee develops the required plans for DEQ review. DEQ also clarified specific use of upstream flow gauge for surface water monitoring.

3.1 Revisions to Schedule B

The proposed revisions to Schedule B are listed below:

3.1.1 Reporting Requirements

The permittee must submit to DEQ monitoring results and reports as listed below.

Table B1: Reporting Requirements and Due Dates

Reporting Requirement	**Frequency**	**Due Date** (See Note a.)	**Report Form** (See Note b.)	**Submit To:** (See Note c & d)
Tables B2 and B3 Influent Monitoring and Effluent Monitoring	Monthly	By the 15th of the following month (See Note f)	Specified in Schedule B. Section 2 of this permit	As directed by DEQ
Groundwater Monitoring Plan	One Time	12 months after permit effective date	Electronic copy in a DEQ-approved format	As directed by DEQ
Groundwater Monitoring	Quarterly	By the 15th of the following month after quarter end (See Note e).	Electronic copy in the DEQ-approved form	As directed by DEQ
Surface Water Monitoring Plan	One Time	12 months after permit effective date	Electronic copy in a DEQ-approved format	As directed by DEQ
Surface water monitoring	Quarterly	By the 15th of the following month after quarter end (See Note e).	Electronic copy in the DEQ-approved form	As directed by DEQ
Recycled Water Annual Report (see Schedule D)	Annually	January 15 (See Note f)	Electronic copy in the DEQ-approved format	As directed by DEQ Electronic copy to DEQ Water Reuse Program Coordinator
Biosolids annual report (See Schedule D)	Annually	February 19 (See Note f)	Electronic copy in the DEQ-approved form	As directed by DEQ DEQ Biosolids Program Coordinator

Reporting Requirement	Frequency	Due Date (See Note a.)	Report Form (See Note b.)	Submit To: (See Note c & d)
Inflow and infiltration report (see Schedule D)	Annually	February 15 (See Note f)	Electronic copy in a DEQ-approved format	As directed by DEQ
Industrial User Survey (see Schedule D)	One Time	January 15, 2024	Electronic copy in a DEQ-approved format	As directed by DEQ Electronic copy to DEQ Pretreatment Program Coordinator
Hauled Waste Control Plan (see Schedule D)	One time	Submit prior to accepting hauled waste	Electronic copy in a DEQ-approved format	As directed by DEQ
Hauled Waste Annual Report (see Schedule D)	Annually	January 15 (See Note f)	Electronic copy in the DEQ-approved format	As directed by DEQ

Notes:

a. For submittals that are provided to DEQ by mail, the postmarked date must not be later than the due date.
b. All reporting requirements are to be submitted in a DEQ approved format, unless otherwise specified in writing.
c. Electronic reporting information is provided on DEQ's web page (https://www.oregon.gov/deq/wq/wqpermits/Pages/NPDES-E-Reporting.aspx).
d. Email address for biosolids and recycled water coordinator are provided on DEQ's biosolids web page (https://www.oregon.gov/deq/wq/programs/Pages/Biosolids.aspx).
e. Monitoring requirements will begin at least six months prior to startup of the upgraded facility and after DEQ approves the city's plan.
f. Monitoring and reporting will begin after the updated facility begins operations

3.1.2 Surface Water Monitoring Requirements

The permittee must monitor surface water of the John Day River as listed below. The samples must be representative of the water flowing in the John Day River at the designated locations. Samples will be collected from the upstream site and downstream site for each sampling event except for total flow which will be collected from the USGS John Day River gauge 14038530. These samples will be collected at the locations identified in the Surface Water Monitoring Plan. The permittee may request a reduction or termination of this sampling effort after collection of three full years of data if the data clearly shows no evidence of discharge of pollutants from the facility to surface water.

Table B8: Surface Water Monitoring

Item or Parameter	Minimum Frequency	Sample Type/ Required Action	Report
Total Flow (MGD)	Quarterly	Measurement	Annual Report
Dissolved Oxygen	Quarterly	Measurement	Annual Report
pH	Quarterly	Measurement	Annual Report
Temperature	Quarterly	Measurement	Annual Report
E. coli	Quarterly	Grab	Annual Report
Total Nitrogen	Quarterly	Grab	Annual Report
BOD_5	Quarterly	Grab	Annual Report

4. Next Steps

The proposed WPCF permit modification is considered a Category I permit action per OAR 340-045-0027.

The modification will become effective upon mailing unless the permittee requests a hearing within 20 days. A permittee must request a hearing in writing and state the grounds for the request. See OAR 340-045-0055.

WATER POLLUTION CONTROL FACILITIES PERMIT

Oregon Department of Environmental Quality
Eastern Region – Pendleton Office
800 SE Emigrant, #330
Pendleton, OR 97801
Telephone: 541-276-4063

Issued pursuant to ORS 468B.050

ISSUED TO:	SOURCES COVERED BY THIS PERMIT:		
City of John Day 450 East Main St. John Day, OR 97845	**Type of Waste**	**Outfall Number**	**Location**
	Domestic Wastewater	001	Lat: 44.42221 Long: -118.97070
	Recycled Water	002	Specified in Recycled Water Use Plan
	Biosolids	003	Specified in Biosolids Management Plan

FACILITY TYPE AND LOCATION:

Sequencing batch reactor with ultraviolet disinfection
700 NW 7th Ave
John Day, OR 97845
County: Grant

RIVER BASIN INFORMATION:

WRD Basin: John Day

USGS Sub-Basin: 170702010902 Upper John Day
Nearest surface water body name: John Day River
LLID: 1206499457318
John Day at RM 248.0

File: 43569 permit 102481 referenced.
Issued in response to Application No. 948631 received December 7, 2021. This permit is issued based on the land use findings in the permit record.

Shannon Davis

Shannon Davis, Acting Water Quality Manager
Eastern Region

4-18-2022
Issuance Date

5-1-2022
Effective Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to construct, install, modify or operate a wastewater collection, treatment, control and disposal system in conformance with the requirements, limits, and conditions set forth in this permit.

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon statute or administrative rule, any direct or indirect discharge of pollutants to waters of the state is prohibited.

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SCHEDULE A: WASTE DISCHARGE LIMITS

1. Permitted System

The City of John Day is authorized to operate and maintain a domestic wastewater treatment facility consisting of a sequencing batch reactor with tertiary filters and ultraviolet light disinfection with an average dry weather flow of 0.3 MGD. Treated effluent will be discharged to rapid infiltration basins or utilized for beneficial purpose as recycled water in accordance with a DEQ approved Recycled Water Use Plan (RWUP).

2. Effluent Limits for Outfall 001

During the term of this permit, the permittee must comply with the effluent limits in Table A1 for discharge into the rapid infiltration basins. Monitoring point must be located after the UV treatment but just prior to discharge to the rapid infiltration basins.

Table A1: Outfall 001 Limits

Parameter	Units	Monthly Average	Weekly Average	Single sample Maximum
BOD_5	mg/L	20	35	--
TSS	mg/L	20	35	--
Total nitrogen	mg/L	5	--	9
E. coli	organisms/100ml	126 (geometric mean)	--	406[a]
pH	SU	Instantaneous limit between a daily minimum of 6.5 and a daily maximum of 8.5		

Note:

a. No single *E. coli* sample may exceed 406 organisms per 100 mL; however, DEQ will not cite a violation of this limit if the permittee takes at least 5 consecutive re-samples at 4 hour intervals beginning within 28 hours after the original sample was taken and the geometric mean of the 5 re-samples is less than or equal to 126 *E. coli* organisms/100mL.

3. Surface Water Protection

Direct discharge to navigable waters as defined in OAR Chapter 340 Division 045 Section 0010 (13) is prohibited.

4. Groundwater Protection

Any activity that has an adverse effect on existing or potential beneficial uses of groundwater is prohibited. All wastewater and wastewater solids must be managed and disposed in a manner that will prevent a violation of the Groundwater Quality Protection Rules (OAR Chapter 340, Division 40). If warranted, at any time, DEQ may evaluate the need for or require a full assessment of the facility's effect on groundwater quality.

The permittee must conduct routine groundwater monitoring as specified in the facility's DEQ approved Groundwater Monitoring Plan.

5. Use of Recycled Water

The permittee is authorized in OAR Chapter 340 Division 055 Section 0012 to distribute recycled water if it is:

a. Treated and used according to the criteria listed in Table A2.

b. Managed in accordance with its DEQ-approved Recycled Water Use Plan unless exempt as provided in Schedule D.

c. Used in a manner and applied at a rate that does not adversely affect groundwater quality.

d. Applied at a rate and in accordance with site management practices that ensure continued agricultural, horticultural, or silvicultural production and does not reduce the productivity of the site.

e. Irrigated using sound irrigation practices to prevent:

i. Offsite surface runoff or subsurface drainage through drainage tile;

ii. Creation of odors, fly and mosquito breeding, or other nuisance conditions; and

iii. Overloading of land with nutrients, organics, or other pollutants.

Table A2: Recycled Water Limits

Class	Level of Treatment (after disinfection unless otherwise specified)	Beneficial Uses
A.	Class A recycled water must be oxidized, filtered and disinfected. Before disinfection turbidity may not exceed: • An average of 2 NTUs within a 24-hour period. • 5 NTUs more than five percent of the time within a 24-hour period. • 10 NTUs at any time. After disinfection, total coliform may not exceed: • A median of 2.2 organisms per 100 mL based on daily sampling over the last 7 days that analyses have been completed. • 23 organisms per 100 mL in any single sample.	Class A recycled water approved uses: • Class B, Class C, Class D, and nondisinfected uses. • Irrigation for any agricultural or horticultural use. • Landscape irrigation of parks, playgrounds, school yards, residential landscapes, or other landscapes accessible to the public. • Commercial car washing or fountains when the water is not intended for human consumption. • Water supply source for non-restricted recreational impoundments.
B.	Class B recycled water must be oxidized and disinfected. Total coliform may not exceed: • A median of 2.2 organisms per 100 mL, based on the last 7 days that analyses have been completed. • 23 total coliform organisms per 100 mL in any single sample.	Class B recycled water approved uses: • Class C, Class D, and nondisinfected uses. • Stand-alone fire suppression systems in commercial and residential building, non-residential toilet or urinal flushing, or floor drain trap priming. • Water supply source for restricted recreational impoundments.

6. Agronomic rates for Nutrient Loading

Crop and site specific agronomic loading rates for nutrients will be approved by DEQ only after consideration of agronomic rates published in appropriate, region specific, fertilizer guides and proposed by the Permittee. DEQ may require adjustment to the allowable agronomic rates after review of annual reporting and to ensure adequate protection of public waters, including groundwater. The Recycled Water Use Plan must list the approved agronomic rates for each proposed crop

7. Biosolids

The permittee may land apply biosolids or provide biosolids for sale or distribution, subject to OAR 340; Division 50 and 40 CFR Part 503, and the following conditions:

a. The permittee must manage biosolids in accordance with its DEQ-approved Biosolids Management Plan and Land Application Plan.

b. The permittee must apply biosolids at or below the agronomic rates approved by DEQ in order to minimize potential groundwater degradation. DEQ may require adjustment to the allowable agronomic rate after review of annual reporting and to ensure adequate protection of public waters, including groundwater.

c. The permittee must obtain written site authorization from DEQ for each land application site prior to land application (see Schedule D) and follow the site-specific management conditions in the DEQ-issued site authorization letter.

d. Prior to application, the permittee must ensure that biosolids meet one of the pathogen reduction standards under 40 CFR 503.32 and one of the vector attraction reduction standards under 40 CFR 503.33.

e. The permittee must not apply biosolids containing pollutants in excess of the ceiling concentrations shown in the table below. The permittee may apply biosolids containing pollutants in excess of the pollutant concentrations, but below the ceiling concentrations, however, the total quantity of pollutant applied cannot exceed the cumulative pollutant loading rates in the table below.

Table A3: Biosolids Limits

Pollutant See note a.	**Ceiling concentrations (mg/kg)**	**Pollutant concentrations (mg/kg)**	**Cumulative pollutant loading rates (kg/ha)**
Arsenic	75	41	41
Cadmium	85	39	39
Copper	4300	1500	1500
Lead	840	300	300
Mercury	57	17	17
Molybdenum	75	N/A	N/A
Nickel	420	420	420
Selenium	100	100	100
Zinc	7500	2800	2800

Note:
a. Biosolids pollutant limits are described in 40 CFR 503.13, which uses the terms *ceiling concentrations*, *pollutant concentrations*, and *cumulative pollutant loading rates*.

SCHEDULE B: MINIMUM MONITORING AND REPORTING REQUIREMENTS

1. Reporting Requirements

The permittee must submit to DEQ monitoring results and reports as listed below.

Table B1: Reporting Requirements and Due Dates

Reporting Requirement	Frequency	Due Date (See Note a.)	Report Form (See Note b.)	Submit To: (See Note c & d)
Tables B2 and B3 Influent Monitoring and Effluent Monitoring	Monthly	By the 15th of the following month	Specified in Schedule B. Section 2 of this permit	As directed by DEQ
Groundwater Monitoring Plan	One Time	12 months after permit effective date	Electronic copy in a DEQ-approved format	As directed by DEQ
Groundwater Monitoring	Quarterly	By the 15th of the following month after quarter end (See Note e).	Electronic copy in the DEQ-approved form	As directed by DEQ
Surface Water Monitoring Plan	One Time	12 months after permit effective date	Electronic copy in a DEQ-approved format	As directed by DEQ
Surface water monitoring	Quarterly	By the 15th of the following month after quarter end (See Note e).	Electronic copy in the DEQ-approved form	As directed by DEQ
Recycled Water Annual Report (see Schedule D)	Annually	January 15	Electronic copy in the DEQ-approved format	As directed by DEQ Electronic copy to DEQ Water Reuse Program Coordinator
Biosolids annual report (See Schedule D)	Annually	February 19	Electronic copy in the DEQ-approved form	As directed by DEQ DEQ Biosolids Program Coordinator
Inflow and infiltration report (see Schedule D)	Annually	February 15	Electronic copy in a DEQ-approved format	As directed by DEQ
Industrial User Survey (see Schedule D)	One Time	January 15, 2024	Electronic copy in a DEQ-approved format	As directed by DEQ Electronic copy to DEQ Pretreatment Program Coordinator
Hauled Waste Control Plan (see Schedule D)	One time	Submit prior to accepting hauled waste	Electronic copy in a DEQ-approved format	As directed by DEQ

Reporting Requirement	Frequency	Due Date (See Note a.)	Report Form (See Note b.)	Submit To: (See Note c & d)
Hauled Waste Annual Report (see Schedule D)	Annually	January 15	Electronic copy in the DEQ-approved format	As directed by DEQ

Notes:
a. For submittals that are provided to DEQ by mail, the postmarked date must not be later than the due date.
b. All reporting requirements are to be submitted in a DEQ approved format, unless otherwise specified in writing.
c. Electronic reporting information is provided on DEQ's web page (https://www.oregon.gov/deq/wq/wqpermits/Pages/NPDES-E-Reporting.aspx).
d. Email address for biosolids and recycled water coordinator are provided on DEQ's biosolids web page (https://www.oregon.gov/deq/wq/programs/Pages/Biosolids.aspx).
e. Monitoring requirements will not begin until after DEQ approves the city's plan

2. Monitoring and Reporting Protocols

a. **Paper Submissions.**

When submitting paper copies as required by table B1, the permittee must submit to DEQ the results of the monitoring in a paper format as specified below.

i. Until directed by DEQ all Discharge Monitoring Reports (DMRs) must be submitted in an approved paper format:

(A) The reporting period is the calendar month.

(B) The permittee must submit monitoring data and other information required by this permit for all compliance points by the 15th day of the month following the reporting period unless specified otherwise in this permit or as specified in writing by DEQ.

ii. Until directed by DEQ, the permittee must submit any required Pretreatment Program Reports, Wastewater Solids and Biosolids Annual Report, Recycled Water Annual Report, Sanitary Sewer Overflow/Bypass Event Reports, and other required information to DEQ.

iii. The permittee must sign and certify submittals of Discharge Monitoring Reports (DMRs), reports, and other information in accordance with the requirements of Section D8 within Schedule F of this permit.

b. **Electronic Submissions.**

When submitting electronic copies as required by table B1, the permittee must submit to DEQ the results of monitoring in an electronic format as specified below.

i. When directed by DEQ, the permittee must submit monitoring results required by this permit via DEQ-approved web-based Electronic Discharge Monitoring Report (DMR) forms.

ii. The reporting period is the calendar month.

iii. The permittee must submit monitoring data and other information required by this permit for all compliance points by the 15th day of the month following the reporting period unless specified otherwise in this permit or as specified in writing by DEQ.

iv. When directed by DEQ, the permittee must submit electronic reports for any required Pretreatment Program Reports, Wastewater Solids and Biosolids Annual Report, Recycled Water Annual Report, Sewer Overflow/Bypass Event Reports, and other required information to DEQ via designated web-based reporting process.

c. **Test Methods.**

The permittee must conduct monitoring according to test procedures in 40 CFR part 136 and 40 CFR part 503 for biosolids or other approved procedures as per Schedule F.

d. **Detection and Quantitation Limits**

i. Detection Level (DL) – The DL is defined as the minimum measured concentration of a substance that can be distinguished from method blank results with 99% confidence. The DL is derived using the procedure in 40 CFR part 136 Appendix B and evaluated for reasonableness relative to method blank concentrations to ensure results reported above the DL are not a result of routine background contamination. The DL is also known as the Method Detection Limit (MDL) or Limit of Detection (LOD).

ii. Quantitation Limits (QLs) – The QL is the minimum level, concentration or quantity of a target analyte that can be reported with a specified degree of confidence. It is the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration for the analyte. It is normally equivalent to the concentration of the lowest calibration standard adjusted for sample weights, volumes, preparation and cleanup procedures employed. The QL as reported by a laboratory is also sometimes referred to as the Method Reporting Limit (MRL) or Limit of Quantitation (LOQ).

iii. For compliance and characterization purposes, the maximum acceptable QL is stated in this permit.

e. **Implementation**

The Laboratory QLs (adjusted for any dilutions) for analyses performed to demonstrate compliance with permit limits or as part of effluent characterization, must be at or below the QLs specified in the permit unless one of the conditions below is met.

i. The monitoring result shows a detect above the laboratory reported QL.

ii. The monitoring result indicates non-detect at a DL which is less than the QL.

iii. Matrix effects are present that prevent the attainment of QLs and these matrix effects are demonstrated according to procedures described in EPA's "Solutions to Analytical Chemistry Problems with Clean Water Act Methods", March 2007. If using alternative methods and taking appropriate steps to eliminate matrix effects does not eliminate the matrix problems, DEQ may authorize in writing re-sampling or allow a higher QL to be reported. In the case of effluent characterization monitoring,

f. **Quality Assurance and Quality Control**

i. Quality Assurance Plan – The permittee must develop and implement a written Quality Assurance Plan that details the facility sampling procedures. This plan should include any equipment calibration and maintenance, analytical methods, quality control activities and laboratory data handling and reporting if the permittee conducts any of their own analytical work. The QA/QC program must conform to the requirements of 40 CFR 136.7.

ii. If QA/QC requirements are not met for any analysis, the permittee must re-analyze the sample. If the sample cannot be re-analyzed, the permittee must re-sample and analyze at the earliest opportunity. If the permittee is unable to collect a sample that meets QA/QC requirements, then the permittee must include the result in the discharge monitoring report (DMR) along with a notation (data qualifier). In addition, the permittee must explain how the sample does not meet QA/QC requirements. The permittee may not use the result that failed the QA/QC requirements in any calculation required by the permit unless authorized in writing by DEQ.

iii. Flow measurement, field measurement, and continuous monitoring devices - The permittee must:

(A) Establish verification and calibration frequency for each device or instrument in the quality assurance plan that conforms to the frequencies recommended by the manufacturer.

(B) Verify at least once per year that flow-monitoring devices are functioning properly according to manufacturer's recommendation. Calibrate as needed according to manufacturer's recommendations.

(C) Verify at least weekly that the continuous monitoring instruments are functioning properly according to manufacturer's recommendation unless the permittee demonstrates a longer period is sufficient and such longer period is approved by DEQ in writing.

g. **Reporting Sample Results**

i. The permittee must report the same number of significant digits as the permit limit for a given parameter.

3. Monitoring and Reporting Requirements

a. The permittee must monitor influent at the headworks to the treatment plant and report results in accordance with the table below:

Table B2: Influent Monitoring Requirements

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type / Required Action See note b.	Report Statistic See note a.
Flow (50050)	MGD	Year-round	Daily	Metered	Monthly Average Daily Maximum
BOD_5 (00310)	mg/L	Year-round	Once per Week	24 Hour Composite[c]	Monthly Average
TSS (00530)	mg/L	Year-round	Once per Week	24 Hour Composite[c]	Monthly Average
pH (00400)	Standard Units SU	Year-round	Once per Week	Grab	Monthly Maximum Monthly Minimum
Hauled Waste	Gallons	Year-round	Daily	Amount Received	Monthly Total

Notes:

a. When submitting DMRs electronically, all data used to determine summary statistics shall be submitted in a DEQ approved format unless otherwise directed by DEQ. If submitting paper DMRs, all data collected shall be reported on each DMR.

b. In the event of equipment failure or loss, the permittee must notify DEQ and repair or replace effected equipment to minimize interruption of data collection. If the equipment cannot be immediately repaired or replaced, the permittee must perform grab measurements daily

c. Composite samples shall consist of no less than 6 samples collected over a 24-hour period and apportioned according to the volume of flow at the time of sampling.

b. The permittee must monitor effluent at Outfall 001 prior to discharge to infiltration basins and report results in accordance with Table B1 and the table below:

Table B3: Effluent Monitoring Requirements

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action See note b.	Report Statistic See note a.
Flow (50050)	MGD	Year-round	Daily	Metered	Monthly Average Daily Maximum
Temperature (00010)	ºC	Year-round	Daily	Metered	Monthly Average Daily Maximum
BOD_5 (00310)	mg/L	Year-round	Once per Week	24-hour composite[c]	Monthly Average Weekly Average
TSS (00530)	mg/L	Year-round	Once per Week	24-hour composite[c]	Monthly Average Weekly Average
pH (00400)	Standard Units (SU)	Year-round	Once per Week	Grab	Daily Maximum Daily Minimum
E. coli (51040)	#/100 mL	Year-round	Once per Week	Grab	Daily Maximum Monthly Median
UV intensity (49607)	mW/cm^2	Year-round	Daily	Continuous	Daily Minimum
UV dose (61938)	(mJ/cm^2)	Year-round	Daily	Calculation	Daily Minimum
UV transmittance (51043)	%	Year-round	Daily	Continuous	Daily Minimum
Total Kjeldahl Nitrogen (TKN) (00625)	mg/L	Year-round	Quarterly	Grab	Quarterly Maximum
Nitrate (NO3) Plus Nitrite (NO2) Nitrogen (00630)	mg/L	Year-round	Quarterly	Grab	Quarterly Maximum
Total Ammonia (as N) (00610)	mg/L	Year-round	Quarterly	Grab	Quarterly Maximum
Total Nitrogen (00600)	mg/L	Year-round	Monthly	Calculated	Monthly
Total Phosphorus (00665)	mg/L	Year round	Monthly	Grab	Monthly
Total Dissolved Solids (70295)	mg/L	Year-round	Quarterly	Grab	Quarterly Maximum

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action See note b.	Report Statistic See note a.

Notes:
a. When submitting DMRs electronically, all data used to determine summary statistics shall be submitted in a DEQ approved format as an attachment unless otherwise directed by DEQ. If submitting paper DMRs, all data collected shall be reported on each DMR.
b. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must perform grab measurements. If the failure or loss is for continuous temperature monitoring equipment, the permittee must perform grab measurements daily between 2 PM and 4 PM until continuous monitoring equipment is redeployed.
c. Composite samples shall consist of no less than 6 samples collected over a 24-hour period and apportioned according to the volume of flow at the time of sampling.

4. Recycled Water Monitoring Requirements: Outfall 002

The permittee must monitor recycled water for Outfall 002 as listed below only when distributing recycled water. The samples must be representative of the recycled water delivered for beneficial reuse at each location identified in the Recycled Water Use Plan.

Table B4: Recycled Water Monitoring

Item or Parameter	Minimum Frequency	Sample Type/ Required Action	Report
Total Flow (MGD)	Daily	Measurement	Annual Report and monthly
Quantity Irrigated (inches/acre)	Daily	Calculation	Annual Report and monthly per field
pH	2/Week	Grab	Annual Report and monthly
Total Coliform	Daily	Grab	Annual Report and monthly
Turbidity (Class A)	Hourly	Measurement	Annual Report and monthly
Total Nitrogen Loading Rate (lbs/acre-year)	Annually	Calculation	Annual Report
Supplemental Fertilizer Applied	As applied	Record Amounts	Annual Report
Nutrients (TKN, NO2+NO3-N, Total Ammonia (as N), Total Phosphorus)	Quarterly	Grab	Annual Report and monthly

5. Biosolids Monitoring Requirements

The permittee must monitor biosolids land applied or produced for sale or distribution as listed below. The samples must be representative of the quality and quantity of biosolids generated and undergo the same treatment process used to prepare the biosolids.

Table B5: Biosolids Monitoring

Item or Parameter	Minimum Frequency	Sample Type
Nutrient and conventional parameters (% dry weight unless otherwise specified): Total Kjeldahl Nitrogen (TKN) Nitrate-Nitrogen (NO_3-N) Total Ammoniacal Nitrogen (NH-N) Total Phosphorus (P) Potassium (K) pH (S.U.) Total Solids Volatile Solids	As described in the DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B6.	As described in the DEQ-approved Biosolids Management Plan
Pollutants: As, Cd, Cu, Hg, Pb, Mo, Ni, Se, Zn, mg/kg dry weight	As described in the DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B6	As described in the DEQ-approved Biosolids Management Plan
Pathogen reduction	As described in the DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B6.	As described in the DEQ-approved Biosolids Management Plan
Vector attraction reduction	As described in the DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B6.	As described in the DEQ-approved Biosolids Management Plan
Record of biosolids land application: date, quantity, location.	Each event	Record the date, quantity, and location of biosolids land applied on site location map or equivalent electronic system, such as GIS.

Table B6: Biosolids Minimum Monitoring Frequency

Quantity of biosolids land applied or produced for sale or distribution per calendar year		Minimum Sampling Frequency
(dry metric tons)	(dry U.S. tons)	
Less than 290	Less than 320	Once per year
290 to 1,500	320 to 1,653	Once per quarter (4x/year)
1500 to 15,000	1,653 to 16,535	Once per 60 days (6x/year)
15,000 or more	16,535 or more	Once per month (12x/year)

6. Groundwater Monitoring Requirements

The permittee must monitor groundwater as listed below. The samples must be representative of the groundwater flowing through the aquifer at the time of sample collection. The samples will be collected at the monitoring well(s) as identified in the Groundwater Monitoring Plan.

Table B7: Groundwater Monitoring

Item or Parameter	Minimum Frequency	Sample Type/ Required Action	Report
Dissolved Oxygen	Quarterly	Measurement	Annual Report
Oxidation Reduction Potential	Quarterly	Measurement	Annual Report
pH	Quarterly	Measurement	Annual Report
Turbidity	Quarterly	Measurement	Annual Report
Temperature	Quarterly	Measurement	Annual Report
Total Suspended Solids	Quarterly	Grab	Annual Report
BOD_5	Quarterly	Grab	Annual Report
Total Dissolved Solids	Quarterly	Grab	Annual Report
Total Nitrogen	Quarterly	Grab	Annual Report
E. coli	Quarterly	Grab	Annual Report
Total Phosphorus	Quarterly	Grab	Annual Report

7. Surface Water Monitoring Requirements

The permittee must monitor surface water of the John Day River as listed below. The samples must be representative of the water flowing in the John Day River at the designated locations. Samples will be collected from the upstream site and downstream site for each sampling event. These samples will be collected at the locations identified in the Surface Water Monitoring Plan. The permittee may request a reduction or termination of this sampling effort after collection of three full years of data if the data clearly shows no evidence of discharge of pollutants from the facility to surface water.

Table B8: Surface Water Monitoring

Item or Parameter	Minimum Frequency	Sample Type/ Required Action	Report
Total Flow (MGD)	Quarterly	Measurement	Annual Report
Dissolved Oxygen	Quarterly	Measurement	Annual Report
pH	Quarterly	Measurement	Annual Report
Temperature	Quarterly	Measurement	Annual Report
E. coli	Quarterly	Grab	Annual Report
Total Nitrogen	Quarterly	Grab	Annual Report
BOD_5	Quarterly	Grab	Annual Report

SCHEDULE C: COMPLIANCE SCHEDULE

This permit has no compliance schedule.

SCHEDULE D: SPECIAL CONDITIONS

1. Inflow and Infiltration

The permittee must submit to DEQ an annual inflow and infiltration report on a DEQ approved form as directed in Table B1. The report must include the following:

a. An assessment of the facility's I/I issues based on a comparison of summer and winter flows to the plant.

b. Details of activities performed in the previous year to identify and reduce inflow and infiltration.

c. Details of activities planned for the following year to identify and reduce inflow and infiltration.

d. A summary of sanitary sewer overflows that occurred during the previous year. This should include the following: date of the SSO, location, estimated volume, cause, follow-up actions and if performed, the results of receiving stream monitoring.

2. Emergency Response and Public Notification Plan

The permittee must develop an Emergency Response and Public Notification Plan ("plan"), or ensure the facility's existing plan is current and accurate, per Schedule F, Section B, and Condition 8 within 6 months of permit effective date. The permittee must update the plan annually to ensure all information contained in the plan, including telephone and email contact information for applicable public agencies, is current and accurate. An updated copy of the plan must be kept on file at the facility for DEQ review. The latest plan revision date must be listed on the plan cover along with the reviewer's initials or signature.

3. Recycled Water Use Plan

In order to distribute recycled water, the permittee must develop and maintain a DEQ-approved Recycled Water Use Plan meeting the requirements in OAR 340-055-0025. The permittee must submit this plan or any significant modifications to DEQ for review and approval with sufficient time to clear DEQ review and a public notice period prior to distribution of recycled water. The permittee is prohibited from distributing recycled water prior to receipt of written approval of its Recycled Water Use Plan from DEQ. The permittee must keep the plan updated. All plan revisions require written authorization from DEQ and are effective upon permittee's receipt of DEQ written approval. No significant modifications can be made to a plan for an administratively extended permit (after the permit expiration date). Conditions in the plan are enforceable requirements under this permit. DEQ will provide an opportunity for public review and comment on any significant plan modifications prior to approving or denying. Public review is not required for minor modifications, changes to utilization dates or changes in use within the recycled water class.

4. Exempt Wastewater Reuse at the Treatment System

Recycled water used for landscape irrigation within the property boundary or in-plant processes at the wastewater treatment system is exempt from the requirements of OAR 340-055 if all of the following conditions are met:

a. The recycled water is an oxidized and disinfected wastewater.

b. The recycled water is used at the wastewater treatment system site where it is generated or at an auxiliary wastewater or sludge treatment facility that is subject to the same NPDES or WPCF permit as the wastewater treatment system.

c. Spray and/or drift from the use does not migrate off the site.

d. Public access to the site is restricted.

5. Wastewater Solids Annual Report

Until the permittee has an approved biosolids program, the permittee must submit a Wastewater Solids Annual Report each year documenting removal of wastewater solids from the facility during the previous calendar year. The permittee must use the DEQ approved wastewater solids annual report form. This report must include the volume of material removed and the name of the permitted facility that received the solids.

6. Biosolids Management Plan

Prior to distributing biosolids to the public, the permittee must develop and maintain a Biosolids Management Plan and Land Application Plan meeting the requirements in OAR 340-050-0031. The permittee must submit these plans and any significant modification of these plans to DEQ for review and approval with sufficient time to clear DEQ review and a public notice period prior to removing biosolids from the facility. The permittee must keep the plans updated. All plan revisions require written authorization from DEQ and are effective upon permittee's receipt of DEQ written approval. No significant modifications can be made to a plan for an administratively extended permit (after the permit expiration date). Conditions in the plans are enforceable requirements under this permit.

a. Site Authorization

The permittee must obtain written authorization from DEQ for each land application site prior to its use. Conditions in site authorizations are enforceable requirements under this permit. The permittee is prohibited from land applying biosolids to a DEQ-approved site except in accordance with the site authorization, while this permit is effective and with the written approval of the property owner. DEQ may modify or revoke a site authorization following the procedures for a permit modification described in OAR 340-045-0055.

b. Public Participation

i. DEQ will provide an opportunity for public review and comment on any significant plan modifications prior to approving or denying. Public review is not required for minor modifications or changes to utilization dates.

ii. No DEQ-initiated public notice is required for continued use of sites identified in the DEQ-approved biosolids management plan.

iii. For new sites that fail to meet the site selection criteria in the biosolids management plan or that are deemed by DEQ to be sensitive with respect to residential housing, runoff potential, or threat to groundwater, DEQ will provide an opportunity for public comment as directed by OAR 340-050-0015(10).

iv. For all other new sites, the permittee must provide for public participation following procedures in its DEQ-approved land application plan.

7. Wastewater Solids Transfers

a. *Within state.* The permittee may transfer wastewater solids including Class A and Class B biosolids, to another facility permitted to process or dispose of wastewater solids, including but not limited to: another wastewater treatment facility, landfill, or incinerator. The permittee must satisfy the requirements of the receiving facility. The permittee must report the name of the receiving facility and the quantity of material transferred in the wastewater solids annual report identified in Schedule B.

b. *Out of state.* If wastewater solids, including Class A and Class B biosolids, are transferred out of state for use or disposal, the permittee must obtain written authorization from DEQ, meet Oregon requirements for the use or disposal of wastewater solids, notify in writing the receiving

state of the proposed use or disposal of wastewater solids, and satisfy the requirements of the receiving state.

8. Hauled Waste Control Plan

The permittee may accept hauled wastes at discharge points designated by the POTW after receiving written DEQ approval of a Hauled Waste Control Plan. Hauled wastes may include wastewater solids from another wastewater treatment facility, septage, grease trap wastes, portable and chemical toilet wastes, landfill leachate, groundwater remediation wastewaters and commercial/industrial wastewaters.

9. Hauled Waste Annual Report

Once the permittee has an approved hauled waste program, the permittee must submit a Hauled Waste Annual Report each year documenting volume of hauled waste received at the facility during the previous calendar year. The permittee must use the DEQ approved hauled waste annual report form.

10. Groundwater Monitoring Plan

The permittee must develop a Groundwater Monitoring Plan within **12 months** of permit effective date. This plan must detail the groundwater monitoring well construction, location and sampling activities and techniques such as but not limited to: purge volumes, field parameter collection and stabilization, sample handling and management, laboratory selection, analytical methods, target detection levels, field instrument calibration, and sampling quality assurance and quality control measures. This plan must be submitted to DEQ for approval. A copy of the approved plan must be kept on file at the facility for DEQ review. The latest plan revision date must be listed on the plan cover.

11. Surface Water Monitoring Plan

The permittee must develop a Surface Water Monitoring Plan within **12 months** of permit effective date. This plan must detail the surface water monitoring locations and sampling activities and techniques such as but not limited to: methods used for sample collection, equipment decontamination, field parameter collection, field instrument calibration, sample handling and management, laboratory selection, analytical methods, target detection levels, and sampling quality assurance and quality control measures. This plan must be submitted to DEQ for approval. A copy of the plan must be kept on file at the facility for DEQ review. The latest plan revision date must be listed on the plan cover.

12. Operator Certification

a. Definitions

i. “Supervise” means to have full and active responsibility for the daily on site technical operation of a wastewater treatment system or wastewater collection system.

ii. “Supervisor” or “designated operator”, means the operator delegated authority by the permittee for establishing and executing the specific practice and procedures for operating the wastewater treatment system or wastewater collection system in accordance with the policies of the owner of the system and any permit requirements.

iii. “Shift Supervisor” means the operator delegated authority by the permittee for executing the specific practice and procedures for operating the wastewater treatment system or wastewater collection system when the system is operated on more than one daily shift.

iv. “System” includes both the collection system and the treatment systems.

b. The permittee must comply with OAR Chapter 340, Division 49, “Regulations Pertaining to Certification of Wastewater System Operator Personnel" and designate a supervisor whose certification corresponds with the classification of the collection and/or treatment system as specified in the DEQ Supervisory Wastewater Operator Status Report. DEQ may revise the permittee’s classification in writing at any time to reflect changes in the collection or treatment system. This reclassification is not considered a permit modification and may be made after the

permit expiration date provided the permit has been administratively extended by DEQ. If a facility is re-classified, a certified letter will be mailed to the system owner from the DEQ Operator Certification Program. Current system classifications are publicized on the DEQ Supervisory Wastewater Operator Status Report found on the DEQ Wastewater Operator Certification Homepage.

c. The permittee must have its system supervised full-time by one or more operators who hold a valid certificate for the type of wastewater treatment or wastewater collection system, and at a grade equal to or greater than the wastewater system's classification.

d. The permittee's wastewater system may be without the designated supervisor for up to 30 consecutive days if another person who is certified at no more than one grade lower than the classification of the wastewater system supervises. The permittee must delegate authority to this operator to supervise the operation of the system.

e. If the wastewater system has more than one daily shift, the permittee must have another properly certified operator available to supervise operation of the system. Each shift supervisor must be certified at no more than one grade lower than the system classification.

f. The permittee is not required to have a supervisor on site at all times; however, the supervisor must be available to the permittee and operator at all times.

g. The permittee must notify DEQ in writing of the name of the system supervisor by completing and submitting the Supervisory Wastewater System Operator Designation Form along with the Delegated Authority form?). The most recent version of this form may be found on the DEQ Wastewater Operator Certification homepage *NOTE: This form is different from the Delegated Authority form. The permittee may replace or re-designate the system supervisor with another properly certified operator at any time and must notify DEQ in writing within 30 days of replacement or re-designation of the operator in charge. As of this writing, the notice of replacement or re-designation must be sent to Water Quality Division, Operator Certification Program, 700 NE Multnomah St, Suite 600, Portland, OR 97232-4100. This address may be updated in writing by DEQ during the term of this permit.

h. When compliance with item (e) of this section is not possible or practicable because the system supervisor is not available or the position is vacated unexpectedly, and another certified operator is not qualified to assume supervisory responsibility, the Director may grant a time extension for compliance with the requirements in response to a written request from the system owner. The Director will not grant an extension longer than 120 days unless the system owner documents the existence of extraordinary circumstances.

13. Industrial User Survey

Industrial User Survey

a. By the date listed in Table B1, the permittee must conduct an industrial user survey as described in 40CFR 403.8(f)(2)(i-iii) to determine the presence of any industrial users discharging wastewaters subject to pretreatment and submit a report on the findings to DEQ. The purpose of the survey is to identify whether there are any industrial users discharging to the POTW, and ensure regulatory oversight of these discharges to state waters.

Should the DEQ determine that a pretreatment program is required, the permit must be reopened and modified in accordance with 40 CFR 403.8(e)(1) to incorporate a compliance schedule for development of a pretreatment program. The compliance schedule must be developed in accordance with the provisions of 40 CFR 403.12(k), and must not exceed twelve (12) months.

14. Reopener Clause

This permit may be re-opened and modified to include new or revised discharge limitations, monitoring, or reporting requirements, compliance conditions and schedules, and special conditions. If necessary, DEQ will commence modification of this permit by notifying the permittee and seeking public comment on the proposed modifications.

The permittee is responsible for requesting modification of this permit to incorporate any proposed system alterations that require a change in the compliance conditions of this permit.

SCHEDULE E: PRETREATMENT ACTIVITIES

This permit does not include a pretreatment program.

SCHEDULE F: WPCF GENERAL CONDITIONS - Domestic

SECTION A. STANDARD CONDITIONS

1. Duty to Comply with Permit
   The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and grounds for an enforcement action. Failure to comply is also grounds for DEQ to modify, revoke, or deny renewal of a permit.

2. Property Rights and Other Legal Requirements
   Issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other rights, or any infringement of federal, tribal, state, or local laws or regulations.

3. Liability
   DEQ or its officers, agents, representatives, or employees may not sustain any liability on account of the issuance of this permit or on account of the construction or maintenance of facilities or systems because of this permit.

4. Permit Actions
   After notice by DEQ, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including but not limited to the following:
   a. Violation of any term or condition of this permit, any applicable rule or statute, or any order of the Environmental Quality Commission;
   b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.

5. Transfer of Permit
   This permit may not be transferred to a third party without prior written approval from DEQ. DEQ may approve transfers where the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of this permit and the rules of the Environmental Quality Commission. A transfer application and filing fee must be submitted to DEQ.

6. Permit Fees
   The permittee must pay the fees required by Oregon Administrative Rules.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance
   At all times the permittee must maintain in good working order and properly operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to comply with the terms and conditions of this permit.

2. Standard Operation and Maintenance
   All waste collection, control, treatment, and disposal facilities or systems must be operated in a manner consistent with the following:
   a. At all times, all facilities or systems must be operated as efficiently as possible in a manner that will prevent discharges, health hazards, and nuisance conditions.
   b. All screenings, grit, and sludge must be disposed of in a manner approved by DEQ to prevent any pollutant from the materials from reaching waters of the state, creating a public health hazard, or causing a nuisance condition.

c. Bypassing untreated waste is generally prohibited. Bypassing may not occur without prior written permission from DEQ except where unavoidable to prevent loss of life, personal injury, or severe property damage.

3. Noncompliance and Notification Procedures

If the permittee is unable to comply with conditions of this permit because of surfacing sewage; a breakdown of equipment, facilities or systems; an accident caused by human error or negligence; or any other cause such as an act of nature, the permittee must:

a. Immediately take action to stop, contain, and clean up the unauthorized discharges and correct the problem.
b. Immediately notify the appropriate DEQ regional office so that an investigation can be made to evaluate the impact and the corrective actions taken, and to determine any additional action that must be taken.
c. Within 5 days of the time the permittee becomes aware of the circumstances, the permittee must submit to DEQ a detailed written report describing the breakdown, the actual quantity and quality of waste discharged, corrective action taken, steps taken to prevent a recurrence, and any other pertinent information.

Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this permit or liability for failure to comply.

4. Wastewater System Personnel

The permittee must provide an adequate operating staff that is duly qualified to carry out the operation, maintenance, and monitoring requirements to assure continuous compliance with the conditions of this permit.

5. Public Notification of Effluent Violation or Overflow

If effluent limitations specified in this permit are exceeded or an overflow occurs that threatens public health, the permittee must take such steps as are necessary to alert the public, health agencies and other affected entitles (e.g., public water systems) about the extent and nature of the discharge in accordance with the notification procedures developed in accordance with General Condition B.6. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

6. Emergency Response and Public Notification Plan

The permittee must develop and implement an emergency response and public notification plan that identifies measures to protect public health from bypasses or upsets that may endanger public health. At a minimum the plan must include mechanisms to:

a. Ensure that the permittee is aware (to the greatest extent possible) of such events;
b. Ensure notification of appropriate personnel and ensure that they are immediately dispatched for investigation and response;
c. Ensure immediate notification to the public, health agencies, and other affected entities (including public water systems). The response plan must identify the public health and other officials who will receive immediate notification;
d. Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained;
e. Provide emergency operations: and
f. Ensure that DEQ is notified of the public notification steps taken.

SECTION C. MONITORING AND RECORDS

1. Inspection and Entry
   The permittee must at all reasonable times allow authorized representatives of DEQ to:
   a. Enter upon the permittee's premises where a waste source or disposal system is located or where any records are required to be kept under the terms and conditions of this permit;
   b. Have access to and copy any records required by this permit;
   c. Inspect any treatment or disposal system, practices, operations, monitoring equipment, or monitoring method regulated or required by this permit; or
   d. Sample or monitor any substances or permit parameters at any location at reasonable times for the purpose of assuring permit compliance or as otherwise authorized by state law.

2. Averaging of Measurements
   Calculations of averages of measurements required for all parameters except bacteria must use an arithmetic mean; bacteria must be averaged as specified in the permit.

3. Monitoring Procedures
   Monitoring must be conducted according to test procedures specified in the most recent edition of **Standard Methods for the Examination of Water and Wastewater**, unless other test procedures have been approved in writing by DEQ and specified in this permit.

4. Retention of Records
   The permittee must retain records of all monitoring and maintenance information, including all calibrations, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. DEQ may extend this period at any time.

SECTION D. REPORTING REQUIREMENTS

1. Plan Submittal
   Pursuant to Oregon Revised Statute 468B.055, unless specifically exempted by rule, construction, installation, or modification of disposal systems, treatment works, or sewerage systems may not commence until plans and specifications are submitted to and approved in writing by DEQ. All construction, installation, or modification shall be in strict conformance with the DEQ's written approval of the plans.

2. Change in Discharge
   Whenever a facility expansion, production increase, or process modification is expected to result in a change in the character of pollutants to be discharged or in a new or increased discharge that will exceed the conditions of this permit, a new application must be submitted together with the necessary reports, plans, and specifications for the proposed changes. A change may not be made until plans have been approved and a new permit or permit modification has been issued.

3. Signatory Requirements
   All applications, reports, or information submitted to DEQ must be signed and certified by the official applicant of record (owner) or authorized designee.

4. Twenty-Four Hour Reporting
   The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) within 24 hours from the time the permittee becomes aware of the circumstances, unless a shorter time is specified in the permit. During normal business hours, DEQ's regional office must be called. Outside of normal business hours, DEQ must be contacted at 1-800-452-0311 (Oregon Emergency Response System).

The following must be included as information that must be reported within 24 hours under this paragraph:

a. Any unanticipated bypass that exceeds any effluent limitation in this permit;
b. Any upset that exceeds any effluent limitation in this permit;
c. Violation of maximum daily discharge limitation for any of the pollutants listed by DEQ in this permit; and
d. Any noncompliance that may endanger human health or the environment.

A written submission must also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:

a. A description of noncompliance and its cause;
b. The period of noncompliance, including exact dates and times;
c. The estimated time noncompliance is expected to continue if it has not been corrected;
d. Steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and
e. Public notification steps taken, pursuant to General Condition B.6.

DEQ may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

SECTION E. DEFINITIONS

1. *BOD or BOD_5* means five-day biochemical oxygen demand.
2. *CBOD or $CBOD_5$* means five-day carbonaceous biochemical oxygen demand.
3. *TSS* means total suspended solids.
4. *Bacteria* means but is not limited to fecal coliform bacteria, total coliform bacteria, *Escherichia coli* (*E. coli*) bacteria, and *Enterococcus* bacteria.
5. *FC* means fecal coliform bacteria.
6. *Total residual chlorine* means combined chlorine forms plus free residual chlorine
7. *Technology based permit effluent limitations* means technology-based treatment requirements as defined in 40 CFR § 125.3, and concentration and mass load effluent limitations that are based on minimum design criteria specified in OAR 340-041.
8. *mg/l* means milligrams per liter.
9. *µg/l* means microgram per liter.
10. *kg* means kilograms.
11. *m^3/d* means cubic meters per day.
12. *MGD* means million gallons per day.
13. *Average monthly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
14. *Average weekly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.
15. *Daily discharge* as defined at 40 CFR § 122.2 means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge must be calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge must be calculated as the average measurement of the pollutant over the day.
16. *24-hour composite sample* means a combination of at least six discrete sample aliquots of at least 100 milliliters, collected at periodic intervals from the same location, during the operating hours of the facility over a 24 hour period. Four (rather than six) aliquots should be collected for volatile organics analyses. The composite must be flow or time proportional, whichever is more appropriate. The sample aliquots must be collected and stored in accordance with procedures prescribed in the most recent edition of *Standard Methods for the Examination of Water and Wastewater*.
17. *Grab sample* means an individual discrete sample collected over a period of time not to exceed 15 minutes.
18. *Quarter* means January through March, April through June, July through September, or October through December.
19. *Month* means calendar month.
20. *Week* means a calendar week of Sunday through Saturday.
21. Commission or Environmental Quality Commission means the governor appointed panel which serves as the Oregon Department of Environmental Quality's policy and rulemaking board.
22. Department means the Oregon Department of Environmental Quality.

Signature: Shannon Davis
Shannon Davis (Apr 18, 2022 16:53 PDT)

Email: shannon.davis@deq.oregon.gov

103281-PERM-JOHNDAYWWTF20220418

Final Audit Report 2022-04-18

Created:	2022-04-18
By:	Patty Isaak (patty.isaak@deq.oregon.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAA0cJKu8pEMz9utZ1Ds_1MTkfPsRUI-cgy

"103281-PERM-JOHNDAYWWTF20220418" History

Document created by Patty Isaak (patty.isaak@deq.oregon.gov)
2022-04-18 - 6:27:07 PM GMT

Document emailed to Shannon Davis (shannon.davis@deq.oregon.gov) for signature
2022-04-18 - 6:27:34 PM GMT

Email viewed by Shannon Davis (shannon.davis@deq.oregon.gov)
2022-04-18 - 7:54:58 PM GMT

Document e-signed by Shannon Davis (shannon.davis@deq.oregon.gov)
Signature Date: 2022-04-18 - 11:53:28 PM GMT - Time Source: server

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APPENDIX B

TECHNICAL SPECIFICATIONS FOR MONITORING WELL CONSTRUCTION

CwM-H2O
Complete Water Management

TECHNICAL SPECIFICATIONS

To: **Well Drilling Contractor**

From: Bob Long, *RG, CWRE*
Ian Godwin, *GIT*

Date: May 1, 2023

Subject: City of John Day – Alluvial Aquifer Monitoring Well Installation Requirements

The following letter outlines the construction of five (5) shallow monitoring wells for the City of John Day's Water Pollution Control Facility (WPCF) permit. The proposed treatment facility is located just west of the current John Day wastewater percolation ponds on the north side of the John Day River. The proposed facility will utilize infiltration trenches to discharge treated water to the shallow alluvial aquifer. Dedicated upgradient and downgradient monitoring wells are required to track infiltrated water flow and quality as part of the WPCF permit.

Previous drilling and test pit excavation work on site has provided a good understanding of the nature of the alluvial aquifer deposits. The technical specifications and proposed well design outlined below are based on this previous field data. However, given the highly disturbed nature of the alluvial aquifer and variability in past dredging depth and extent, the conditions encountered during drilling may vary from what is expected.

The project scope of work includes the drilling, installation, and development of five (5) shallow monitoring wells. The work is expected to be completed with one site mobilization/demobilization.

MONITORING WELL CONSTRUCTION

Based on log information from several borings on site and monitoring wells around the percolation ponds to the east, the base of the coarse dredge tailings and alluvial deposits is estimated to be between 18 and 25 ft bgs at the proposed site (Figure 1). However, the drilling contractor should be prepared to install the wells as deep as 30 ft, as tailings of this thickness have been observed elsewhere in the John Day River valley. The static water level can be expected at approx. 5–12 ft bgs.

The five monitoring wells are split into three groups:

- CJD-1: one upgradient background monitoring well (east)
- CJD-2: one infiltration point monitoring (central), and
- CJD-3, 4 & 5: three downgradient monitoring wells (west).

The proposed locations of the monitoring wells are shown in Figure 2. All wells are located either on City property or within City right-of-way along the west side of Patterson Bridge Road.

The monitoring wells will be constructed as permanent features. Each well will be advanced until the based of the alluvial aquifer is reached, as determined by the CwM hydrogeologist on site. The base of the alluvium is typically marked by a transition to greenish-gray, dense, compacted sandy silt and clay sediment.

All five monitoring wells will have the following general construction specifications:

- Sonic drilling method is preferred (no drilling fluids).
- Sample boxes not necessary. Sonic cuttings to be placed in bags for inspection.

- 6”-diameter boreholes advanced to the bottom of the alluvial aquifer (~25 ft).
- 2”-ID Sch. 40 PVC casing to approximately 7 ft bgs.
- 2”-ID Sch. 40 PVC screen with 0.02” slot size from approximately 7 ft to bottom of well.
- 2”-ID Sch. 40 PVC cap at the bottom of the well to act as a sediment sump.

- 10-20 or 12-20 sand filter pack from 5 ft to the bottom of the well.
- Hydrated bentonite pellet seal from the surface to 5 ft bgs, or top of filter pack.

The five monitoring wells may vary in their surface completions. Most, if not all, of the wells will have an above-ground monument with protective bollards. However, final site selection for the wells may require one or more wells to have a flush-mounted vault completion. Above-ground monument completions will have the following specifications:

- 6-8”-diameter steel protective casing with a lockable lid.
- 3-ft stick-up of the 2” PVC casing with well cap.
- The lower 2 ft of the protective casing around the well should be filled with coarse sand.
- 3-ft by 3-ft concrete pad around the protective casing.
- 3 protective concrete-filled bollards installed approximately 4-5 ft back from the well. The bollards should be painted yellow for visibility.

Any flush-mounted vault completions will have the following specifications:

- Water-tight steel flush-mounted well cover with at least two closure bolts (such as EMCO 8” Bolt Down Manhole Cover).
- The well vault must extend at least 12” below the surface.
- The well vault will be set within a 3-ft by 3-ft concrete pad set nearly flush to ground surface, sloping away from the vault cover.
- An air-tight well cap on the 2” PVC well casing.

WELL COMPLETION AND DEVELOPMENT

The monitoring wells will be considered completed when the casing and seal are in place, each well has been satisfactorily developed, and the surface completions are in place. Well development will include the removal of all loose material from the bottom of the casing as well as pumping to remove sand and clear out the well screens.

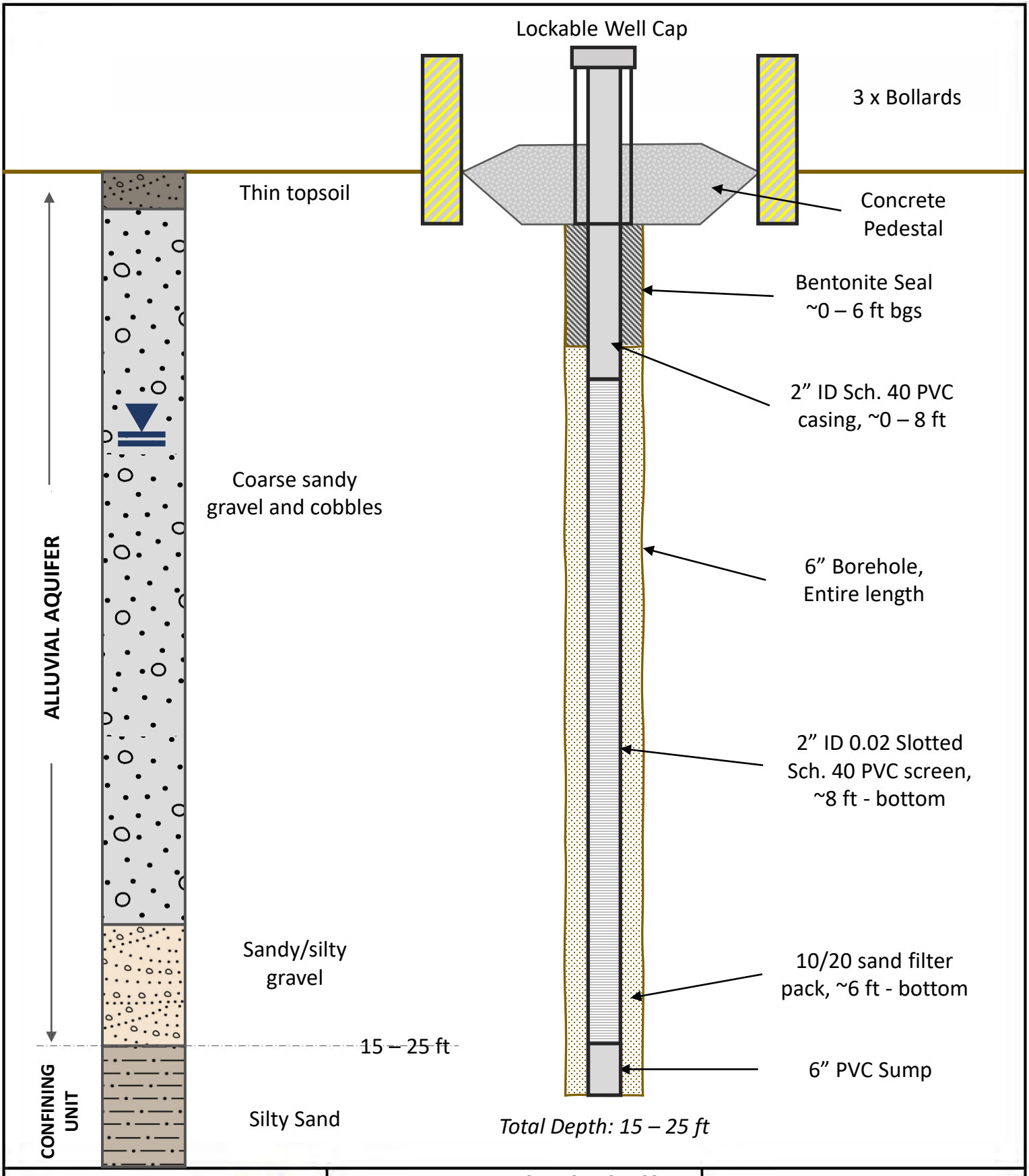
For bidding and scheduling purposes, assume that each well will require the following development:

- 0.5 hours of bailing with a stainless steel or disposable plastic bailer.
- 1.5 hours of purging with a low-flow (<3 gpm) submersible electric pump. The pump and a power supply must be provided by the contractor.

CwM staff will measure field water quality parameters (temperature, pH, conductivity, etc.) during pumping to determine when development is complete.

ATTACHMENTS

- Figure 1 – Permanent Monitoring Well Construction Diagrams
- Figure 2 – Field-marked Locations of Monitoring Wells (map)
- Well Construction Bid Form



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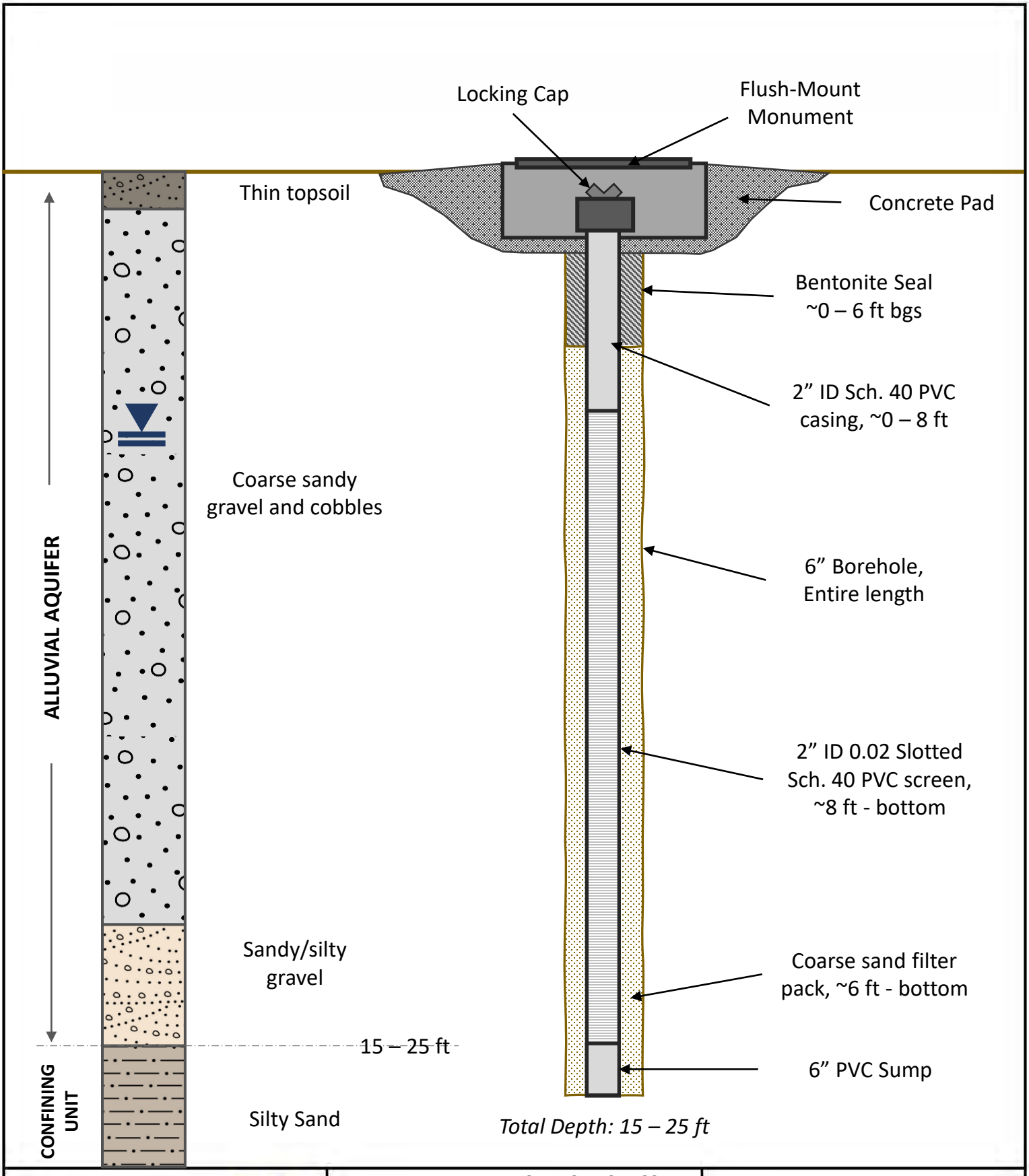
APPENDIX B – TECHNICAL SPECS
Above-ground Monument
Monitoring Well Design

No.	Date	By	Revisions
1	DATE	AUTH	DRAFT

Drawing Not to Scale

Proj#: 2111007
John Day Hydrogeologic Investigation

City of John Day
Oregon



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APPENDIX B – TECHNICAL SPECS
Flush-mount Monument
Monitoring Well Design

No.	Date	By	Revisions
1	DATE	AUTH	DRAFT

Drawing Not to Scale

Proj#: 2111007
John Day Hydrogeologic Investigation

City of John Day
Oregon

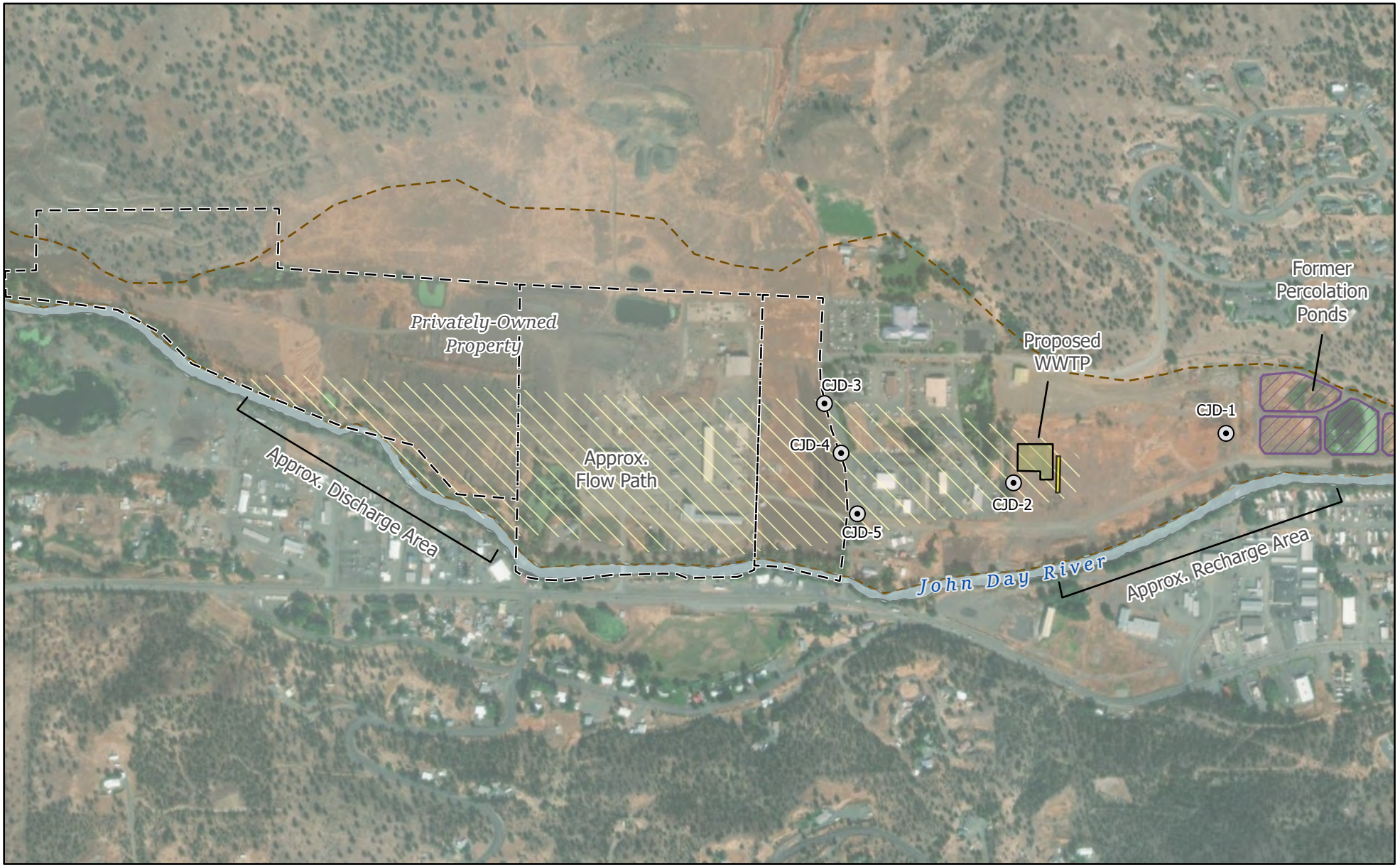

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Figure 2
Groundwater Flow in the Alluvial Aquifer System

No.	Date	By	Revisions
1	DATE	AUTH	DRAFT

0 375 750 1,500 ft

1" = 750'

Proj#: 2111005
CJD Monitoring Plans

City of John Day

N

- Alluvial Aquifer Boundary
- Private Land Down-gradient
- Proposed Monitoring Wells

BID FORM

Bidder submits the Bid with the specific understanding that:

1. The Bid is balanced.
2. The quantities provided are estimates.
3. The City uses the estimated quantities only to compare Bids.
4. Payment on the Bid items are based on the actual calculated quantities of work completed and may be increased or decreased in the final payment.

Bidder, having full knowledge of the quality of the material and labor to be performed, proposes to perform all labor, and furnish all materials necessary for JOHN DAY WPCF PERMIT GROUNDWATER MONITORING at the unit prices as provided below. If Bidder makes a mistake in the extension of prices, the unit prices shall govern.

	Alluvial Aquifer Monitoring Wells (5)					
Item No.		Approximate Total Qty		Unit Price		Total Amount
Pre-Drilling Activity – Start-card and Special Standards						
1	Obtain a drilling start-card and special construction standards waiver from OWRD, ensure that a water source is available if needed for drilling, ensure that there is sufficient access for drilling equipment to arrive on site, complete the required utilities clearance survey.	5	Lump Sum	$		$
Monitoring Wells - Drilling and Installation						
2	Drill five (5), 6-inch boreholes from ground to 30 ft bgs.	150	Linear Feet	$	per/foot	$
3	Furnish and install 2-inch nominal PVC casings to ~7 ft bgs for each of the five (5) monitoring wells, with 3-ft stickups.	50	Linear Feet	$	per/foot	$
4	Install cement grout/bentonite seal for 2-inch casing to ~5 ft bgs for each of the five (5) monitoring wells.	50	Linear Feet	$	per/foot	$
5	Furnish and install 2-inch nominal slotted PVC screen with 0.02" slot from the bottom of casing to the bottom of the borehole for each of the five (5) monitoring wells.	100	Linear Feet	$	per/foot	$
6	Bagging drill tailings for geologist inspection as requested during drilling of each of the five (5) monitoring wells.	5	Lump Sum	$		$
7	10-20 or 12-20 filter pack sand installed from the bottom of the seal to the bottom of the well for each of the five (5) monitoring wells.	125	Linear Feet	$	per/foot	$
Monitoring Wells - Development and Completion						
8	Install a flush-mount monument set in concrete with a locking well cap or lid for each monitoring well.	1	Lump sum	$		$
9	Install above ground monuments with protective metal casing and locking lid, 2" PVC casing cap, concrete pad, and three protective bollards.	4	Lump sum	$		$
10	Complete well development and clean out any drill cuttings remaining in the well after development.	10	Hours	$	per/hour	$
Subtotal for Line Items 1 through 10						**$**
11	Mobilization and Demobilization including all equipment and incidental items for installing and developing the wells and site preparation.	1	Lump sum	$		$
TOTAL BASE BID FOR WORK						**$**

APPENDIX C
EXAMPLE FIELD REPORT FORMS

Well Installation Geologic Log

Borehole/Well No.

Project No.:_____ Date:_____

Client:_____

Location:_____

Logged By:_____

Drilling Co.:_____

Drill Rig Model:_____

Driller:_____

Drilling Method:_____ Hole Diameter:_____

Boring Completion Depth:_____

Elevation:_____ Lat/Lon: _____

Depth to Water:_____

Well Casing Diameter:_____

DEPTH	TIME	BLOWS / PRESSURE (psi)	SAMPLE NO.	DRILL RIG NOISE / VIBRATIONS	RECOVERY (ft./ft.)	STATIC WATER LEVEL	WELL CONSTRUCTION DIAGRAM	U.S.C.S. SYMBOL	GEOLOGIC MATERIAL DESCRIPTION

NOTES:

WELL DEVELOPMENT LOG

Client: _____
Project: _____
Site: _____
Project Number: _____
Field Personnel: _____
Date: _____

WELL ID: _____

WELL PURGE VOLUME INFORMATION				
Equation for 1 Well Volume: WV = [(WC x PV) + (WC x AV) x FP x 7.48]				
Term	Description	Units	Derivation	Value
TD	Total Well Depth	ft	TD = Initial depth of well	
DTW	Depth to Water	ft	DTW = Initial depth to water	
WC	Water Column Height	ft	WC = TD - DTW	
PV	Pipe Volume	ft^3	PV = $(\pi/4)$ x (pipe diameter feet)^2 x WC	
AV	Annular Volume	ft^3	AV = [$(\pi/4)$ x (annular diameter feet)^2 x WC] - PV	
FP	Filter Pack Porosity	%	FP = varying; (generally 30% for sand)	
WV	Well Volume	gal	WV = [(WC x PV) + (WC x AV) x FP x 7.48]	

1 Well Volume : _____ gal

BAIL AND SURGE RECORD				
Description	Volume Bailed (gal)	Time (start)	Time (end)	TD (ft bgs)
Initial Bail (prior to 1st surge):				
1st Surge :	-			-
Second Bail (following 1st surge):				
2nd Surge:	-			-
Third Bail (following 2nd surge, if necessary):				

Total Volume Bailed : _____ gal
Total Time Surged : _____ mins

JETTING RECORD			
Description	Time (start)	Time (end)	TD (ft bgs)
1st Jetting:			
Volume Bailed Post-Jetting:			
2nd Jetting:			
Volume Bailed Post-Jetting:			

Total Time Jetted : _____ mins

PURGE DATA									
TIME	DTW (ft)	Volume (gal)	Flow Rate (gpm)	Temp. ($^oF/C$)	Ph	Conductivity (mS/cm)	Turbidity (NTU)	Color	Particulates

Total Volume Bailed : _____ gal
Total Volume Purged : _____ gal

Total Well Volume Purged : _____ gal

Estimated Recharge Rate : _____ gpm
Type of Pump : _____

Initial TD : _____
Final TD : _____

NOTES

MONITORING WELL INSPECTION LOG

Date/Time:	
Well ID:	
Report No:	
Inspector:	
Sampling Quarter:	Spring Summer Fall Winter
Weather Conditions:	Clear Partly Cloudy Overcast Raining Snowing
Temperature:	Min: Max:
Wind:	Low Moderate High

	YES	NO	N/A
Is the well ID tag still present and visible? Notes:			
Are the protective bollards still in place and secure? Notes:			
Is the well locked? Notes:			
Is the outer protective metal casing in good condition? Notes:			
Is the inner PVC casing in good condition? Notes:			
Is the well clear of plants and debris? Notes:			
Are there any signs of vegetation or animal ingress into the well? Notes:			
General Observations and Notes:			

Name of Inspector: _____ Signature: _____

WELL SAMPLING LOG

Client: _____
Project: _____
Site: _____
Project Number: _____
Field Personnel: _____
Date: _____

WELL ID: _____

GENERAL INFORMATION				
Term	Description	Units	Derivation	Value
SI	Screened Interval	ft	SI = Interval of well screen	
SU	Stickup Height	ft	SU = Hight of well box/stickup from ground surface	
DP	Depth of Pump	ft	DP = Depth of pump from top of port	

WELL PURGE VOLUME INFORMATION				
Equation for 1 Well Volume: WV = [(WC x PV) + (WC x AV) x FP x 7.48]				
Term	Description	Units	Derivation	Value
TD	Total Well Depth	ft	TD = Initial depth of well	
DTW	Depth to Water	ft	DTW = Initial depth to water	
WC	Water Column Height	ft	WC = TD - DTW	
PV	Pipe Volume	ft^3	PV = (π/4) x (pipe diameter feet)^2 x WC	
AV	Annular Volume	ft^3	AV = [(π/4) x (annular diameter feet)^2 x WC] - PV	
FP	Filter Pack Porosity	%	FP = varying; (generally 30% for sand)	
WV	Well Volume	gal	WV = [(WC x PV) + (WC x AV) x FP x 7.48]	

1 Well Volume : _____ gal

FIELD INSTRUMENT CALIBRATION			
Parameter	Standard Value	Units	Calibration Value
pH	7	-	
Conductivity		mS/cm	
ORP		mV	
DO		mg/L	
Other			

Field Instrument Type: _____

PURGE DATA											
TIME	DTW (ft)	Volume (gal)	Flow Rate (gpm)	Temp. (°F/C)	Ph	Conductivity (mS/cm)	Turbidity (NTU)	Color	ORP (mV)	DO (mg/L)	Particulates

Total Volume Purged : _____ gal
Purged Dry? : yes / no

Type of Pump : _____
Field Parameters Stable? : yes / no

Initial TD : _____
Final TD : _____

SAMPLE INFORMATION			
	Sample ID	Date	Time
Primary			
Duplicate			
Other			

NOTES

Daily Activity Log

Client: ____________________

Project: ____________________

Site: ____________________

Project Number: ____________________

Field Personnel: ____________________

Date: ____________________

Date	Time	Description of Activity

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST

Page _____ of _____ COC # _____

Client: _____
Project: _____
Site: _____
Project Number: _____
Sampled By: _____
Receiving Lab: _____
P.O.#: _____

Requested Analytical Method

Turnaround Time

____ Standard
_____ 24 hr. _____48 hr. _____ 3-5 day
_____ 7 day _____14 day _____ day

EDD Data Required?
Yes_____ No_____
Send To: _____

Sample ID	Date	Time	Matrix	Lab ID	No. Containers															Comments

Relinquished by:
Name: Firm:
Signature:
Date: Time:

Received by:
Name: Company:
Signature:
Date: Time:

Shipping Details
Method of shipment:

Airbill #:

Relinquished by:
Name: Firm:
Signature:
Date: Time:

Received by:
Name: Company:
Signature:
Date: Time:

Additional Remarks/Comments:
Report to:

APPENDIX D

FIELD SAMPLING AND MONITORING EQUIPMENT LIST

City of John Day
Water Pollution Control Facility (WPCF) Permit
Groundwater Monitoring Plan

Groundwater Monitoring and Sampling Field Equipment List

Proposed Equipment for Measurement of Field Parameters:

Proposed Equipment	Required Parameter	Accuracy*
Sper Scientific Water Quality Meter *or similar*	Temperature	± 0.8 °C
	pH	± 0.02
	Oxidation-Reduction Potential (ORP)	± 0.5%
	Dissolved Oxygen (DO)	± 0.4 ppm
Lutron TU-2016 Turbidity Meter *or similar*	Turbidity	± 5%
Durham Geo-Slope Water Level Meter *or similar*	Groundwater Depth	± 0.01 ft

**Based on manufacturer specifications.*

Proposed Equipment for Monitoring Well Purging and Sampling:

- ☐ Proactive Stainless Steel Mega-Monsoon Sampling Pump (or similar)
- ☐ 50-ft of 3/16" LPDE tubing for purging and sampling
- ☐ Powder-free nitrile gloves
- ☐ 1-L bottles for measuring flow rate
- ☐ Clean 5-gallon buckets (2)
- ☐ Distilled/purified water (2 gallons per sampling event)
- ☐ Alconox detergent
- ☐ Scrub brush and spray bottle
- ☐ Paper towels
- ☐ Plastic sheeting and garbage bags
- ☐ Sharpie markers for labeling
- ☐ Field log sheets and notebook

- ☐ Lab-provided sample bottles
- ☐ Cooler for sample transport
- ☐ Ice for coolers

SURFACE WATER MONITORING PLAN - CITY OF JOHN DAY

Water Pollution Control Facility (WPCF) Permit #103281

Project No. 2111005
May 1, 2023

PREPARED FOR:

City of John Day
Rick Allen, Interim City Manager
450 East Main Street
John Day, OR 97845

CwM-H2O
Complete Water Management

Contents

Tables

Figures

Appendices

1 Introduction

This document presents the Surface Water Monitoring Plan (Plan) for the City of John Day's (City) municipal wastewater treatment and disposal system. The City operates and maintains its municipal wastewater system under the authority granted by Oregon Department of Environmental Quality (DEQ) Water Pollution Control Facilities (WPCF) Permit #103281 (see Appendix A for a copy of the Permit). This Permit was issued by DEQ pursuant to ORS 468B.050 on April 18, 2022 with an effective date of May 1, 2022.

The WPCF permitting pathway is intended for discharges to groundwater aquifers, such as in the case of the proposed WWTP. However, the City's WPCF Permit includes conditions for surface water monitoring in the John Day River, which is hydraulically connected to the receiving aquifer. Therefore, this Plan is organized into four main sections generally configured to match the requirements of OAR 340-040-0030 for Groundwater Quality Protection – Permitted Operations and the Groundwater Monitoring Plan (GMP) assembled by the City for Permit #103281. The sections of this report are as follows:

- **Section 1** – Introduction (OAR 340-040-0030(2)(a))
- **Section 2** – Surface Water Monitoring System (OAR 340-040-0030(2)(a)(A))
- **Section 3** – Sample Collection and Analysis Program (OAR 340-040-0030(2)(a)(B))
- **Section 4** – Data Analysis and Reporting Procedures (OAR 340-040-0030(2)(a)(C))F

1.1 Purpose and Goals

The purpose of this Plan is to present the surface water monitoring activities proposed by the City to meet the conditions of WPCF Permit #103281 (Permit). The Permit is for the City's updated treatment facility consisting of sequencing batch reactors, tertiary filtration, and UV disinfection. Treated wastewater will then either be utilized for beneficial reuse purposes through the City's proposed purple-pile network or discharged to a subsurface rapid infiltration gallery system.

Once implemented, this Plan is intended to meet the following objectives:

- Develop a surface water monitoring system to observe water quality conditions in the segment of the John Day River adjacent and down-stream from the proposed WWTP,
- Define a sampling schedule and sampling procedures,
- Identify the equipment necessary for sampling and data collection,
- Determine quality assurance and quality control measures for both field and laboratory testing,
- Provide field reporting and annual reporting requirements.

1.2 Proposed Wastewater Treatment System

The City's WPCF Permit #103281 is related to a new WWTP facility, which will be comprised of membrane bioreactor, mechanical, and aerobic digestion treatment with options for both treated wastewater reuse and for disposal through subsurface infiltration trenches. Collected wastewater will be diverted through an oversized pipe around the City's current WWTP and percolation ponds westward, where it will enter into the new WWTP headworks. The oversized pipeline will provide some flow equalization capabilities. The headworks will consist of screens for grit removal and large solids reduction. Influent pumps will push the screened wastewater through an influent meter device and into one of two packaged membrane bioreactor (MBR)

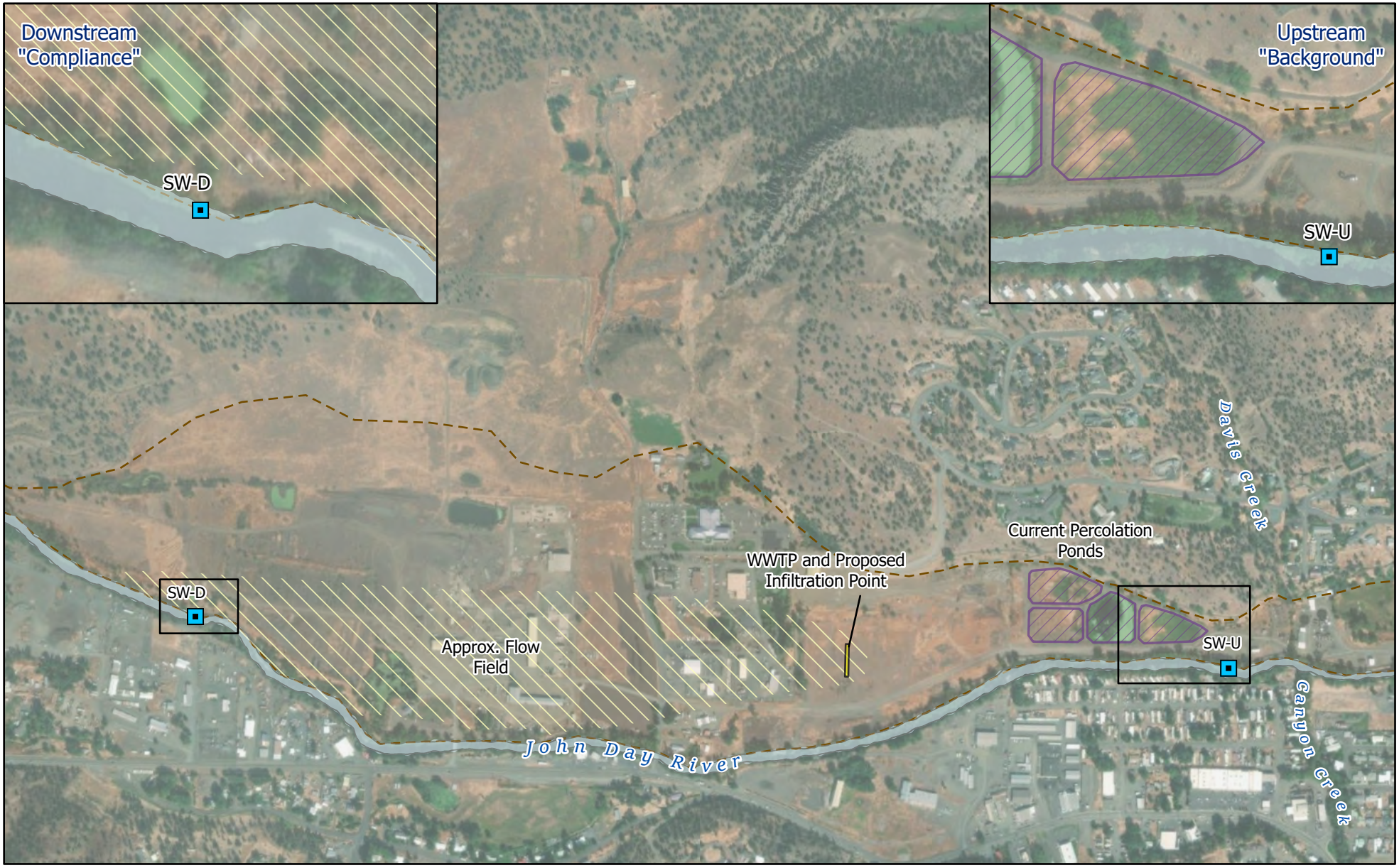

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Figure 1
Groundwater Flow in the Alluvial Aquifer & Proposed Surface Water Monitoring

No.	Date	By	Revisions
1	DATE	AUTH	DRAFT

0 375 750 1,500 ft

1 : 10,000

Proj#: 2111005
CJD Monitoring Plans

City of John Day

N

- Alluvial Aquifer Boundary
- Percolation Ponds
- Proposed Surface Water Sampling Site

trains. Each train will consist of an anaerobic basin, anoxic basin, and pre-aeration basin, a feed-forward pump, and an MBR basin with membrane cassettes to form filtered permeate liquid.

Permeate liquid will then be fed to either a hydroponic treatment system, a potential tertiary treatment system, or through UV disinfections systems. Water that passes through the UV disinfection will be stored temporarily in a recycled water reservoir. Recycled water will either be pumped into the City's purple-pipe network for beneficial reuse or, when reuse demand does not meet treated wastewater production, will be sent to the subsurface infiltration gallery system.

As described in Section 2, the permitted WWTP will have a surface water monitoring system on the John Day River consisting of one up-gradient (background) monitoring station and one down-gradient (compliance-point) monitoring station. Up- and down-gradient location is relative to the proposed infiltration gallery location and the groundwater flow field as defined in the previous CwM-H2O, LLC (CwM) site hydrogeologic investigation report (CwM, 2021). These monitoring locations are displayed in Figure 1 – Groundwater Flow in the Alluvial Aquifer System & Proposed Surface Water Monitoring Locations.

2 Surface Water Monitoring System

As part of Permit #103281, the City must submit for Department approval a Plan for the segment of the John Day River adjacent to the proposed WWTP facility and groundwater monitoring area. The proposed elements of the Plan must allow for general flow rate and water quality monitoring of the affected segment of the river and comparison to an up-stream, background segment of the river.

The subsurface infiltration system will introduce treated wastewater effluent to the shallow alluvial aquifer system in the John Day River Valley, the only impacted aquifer system. No direct discharge to surface water will occur. However, the alluvial aquifer targeted for infiltration is understood to be hydraulically connected to the John Day River. The following subsections outline the properties of the target aquifer and groundwater flow in the area to understand the requirements of the WPCF Permit and the proposed surface water monitoring system.

2.1 Affected Aquifer and River Systems

This Plan meets the State's Groundwater Quality Protection rules (OAR 340-040) by protecting the uppermost aquifer and other aquifers affected by the proposed WWTP activities. The DEQ's Permit conditions extend this protection to the reach of the John Day River adjacent to the alluvial aquifer and proposed WWTP facility. This Plan accomplishes the goals of the Permit conditions by proposing a monitoring system sufficient to compare background water quality in the John Day River to water quality downstream from the proposed wastewater infiltration activities.

The subsurface infiltration system introduces the treated wastewater effluent to the uppermost aquifer system, the shallow alluvial aquifer of the John Day River Valley. The alluvial aquifer is the only impacted aquifer system identified in the CwM-H2O, LLC (CwM) Hydrogeologic Investigation report (CwM, 2021). The alluvial aquifer ranges from just a few feet thick along the John Day valley walls to up to 50-ft thick in some areas at the center of the valley. Native alluvial deposits in the John Day Valley consist of relatively compacted silts and sands interspersed with gravels and cobbles. Large-scale dredging in the late 19th and early 20th centuries transformed the alluvial aquifer around the City by washing away most of the fine sediment and redepositing

the rest. Dredged areas now consist primarily of sandy gravel and cobbles. Patches of silty sand can be found where dredge ponds were constructed or where finer sediments settled out of the tailings.

The John Day River acts as a hydrologic divide in the shallow alluvial aquifer. Because of the hydraulic influence of the river on local groundwater flow, only the alluvial aquifer north of the river will be impacted by the activities performed under the WPCF Permit. Based on previous hydrogeologic field investigations and groundwater modeling efforts (CwM, 2021), it is understood that this section of the alluvial aquifer discharges back to the John Day River at its western (down-gradient) end (see Section 2.2). The proposed surface water monitoring sites in this Plan will monitor water quality upstream and downstream of the anticipated discharge area.

2.2 Groundwater Recharge, Flow, and Discharge

The permitted WWTP facility is located in an oblong section of the alluvial aquifer, bounded on the north by bedrock of the valley wall and to the south by the John Day River. The river's channel flows up against the valley wall to the west and east of the WWTP, pinching out the alluvial aquifer and creating a flow-through groundwater system (Figure 1). The confluence of Davis Creek (flows from the north) and Canyon Creek (from the south) with the John Day River marks the up-gradient end of the section of the alluvial aquifer in which the WWTP is situated.

The John Day River recharges the alluvial aquifer in its losing reach upstream (east) of the proposed WWTP. Groundwater flows through the alluvial aquifer from east to west. The groundwater gradient in the aquifer generally follows the gradient of the river and the gradual slope of the valley to the west. Groundwater discharges from the aquifer back to the John Day River channel towards the western terminus of the alluvial deposits north of the river (CwM, 2021).

Treated wastewater that is infiltrated into the alluvial aquifer will percolate downward to the saturated zone before flowing down-gradient to the west (Figure 1). Groundwater modeling of the subsurface infiltration gallery system indicated that the bulk of the infiltrated water will discharge to the river over more than 100 m of riverbank approximately 1 km downstream of the WWTP facility under average river conditions (CwM, 2021). Modeling suggests that when river levels are very low, infiltrated water may discharge to the river over a more up-stream reach. Conversely, when river levels are very high, such as in the spring snowmelt season, infiltrated water is pushed further downgradient before discharging to the river. The results of the hydrogeologic site investigation and groundwater modeling study were used to guide site selection for the surface water monitoring sites.

2.3 Proposed Surface Water Monitoring

Based on conditions of the City's WPCF Permit #103281, this Plan includes:

- One Upstream Monitoring Point – located upstream of the proposed WWTP facility and infiltration point.
- One Downstream Monitoring Point – located within a downstream segment of the John Day River.

The Permit does not specify the precise locations where monitoring is required to occur, other than upstream and downstream of the proposed facility. The existing (to be decommissioned) WWTP percolation ponds are located at the upstream end of the alluvial aquifer. In order to avoid monitoring surface water quality within the segment of the John Day River affected by current operations, the City proposes to monitor the river

upstream from the percolation ponds. However, background conditions in this reach of the John Day River and influenced by inputs from Canyon Creek and Davis Creek. The proposed upstream monitoring point is therefore located in the reach of the river downstream from these two tributaries but upstream from the percolation ponds (Figure 1). The City also proposes that the downstream monitoring location be within the groundwater-to-surface water discharge area of the alluvial aquifer to the John Day River (Figure 1).

2.3.1 Upstream and Downstream Monitoring Points and Flow Rate

The City proposes to demarcate two dedicated surface water monitoring points for the new WWTP facility. The upgradient or background monitoring point (SW-U) will be located on the John Day River between the existing percolation ponds and the confluence of Davis and Canyon Creeks with the river (Figure 1). While sampling will occur at this location, flow data will come from the USGS stream gage station (#14038530) for the John Day River, which is located several miles upstream from the City.

The downstream monitoring point (SW-D) will be located within the anticipated area of discharge from the alluvial aquifer to the John Day River. The proposed monitoring point is located about 3,800 ft due west of the infiltration galleries, near the center of the anticipated discharge zone (Figure 1). The river water quality at this location will capture potential changes due to infiltration activity.

2.3.2 Monitoring Point Installation

The City will develop the surface water monitoring points as soon as the Plan is approved by the DEQ. Each monitoring point will consist only of an access point to the John Day River bank, marked with a metal post or other marker, and kept clear of vegetation and debris. There will be no permanent equipment installed as part of the surface water monitoring points.

3 Sample Collection and Analysis Program

The City will collect samples from the two surface water monitoring points on a quarterly basis in accordance with WPCF Permit #103281 requirements. The City will perform quarterly sampling at evenly spaced intervals throughout the year with the intent of sampling at approximately the same time each quarter. Sampling of surface water will occur on the same days as groundwater sampling. The exact timing of quarterly sampling will be determined based on when the background monitoring program begins.

The following section describes the Sampling and Analysis Program (SAP) procedures to be used for groundwater monitoring at the City's wastewater treatment facilities. The goal of the SAP is to produce accurate, reliable, and robust groundwater quality data to maintain compliance with the WPCF Permit conditions. The SAP describes procedures involved with the following processes:

- Surface water sampling procedures,
- Equipment decontamination procedures,
- Sample packing and shipping,
- Analytical laboratory procedures,
- Record keeping and chain of custody (COC),
- Quality assurance.

3.1 Monitoring and Sampling Parameters

The surface water quality parameters required by the WPCF Permit are shown in Table 1. During each quarterly event, grab samples will be collected from the John Day River at each surface water monitoring point (Section 3.3.6). The analytical parameters listed in Table 1 will be measured or included in sample analyses as required by the City's WPCF Permit.

Table 1 – Required Surface Water Quality Monitoring Parameters

Parameter	Minimum Frequency	Sampling Type	Reporting
Total Flow MGD (upstream)	Quarterly	Field Measurement	Annually
Dissolved Oxygen (DO)			
pH			
Temperature			
Biological Oxygen Demand (BOD_5)		Grab Sample (Lab Measurement)	
Total Nitrogen			
E. coli			

3.2 Sampling Frequency and Duration

Surface water samples will be collected, at minimum, on a quarterly basis as required by the City's WPCF Permit (Table 1). It is understood that quarterly sampling will continue for a minimum of three years. After three years, if the data presents no evidence of pollutant impacts to the John Day River, the City will request the reduction or termination of surface water monitoring, in accordance with the WPCF Permit.

Surface water samples and groundwater samples from all five monitoring wells will be collected on the same day. Field-measured parameters will be measured at the surface water monitoring site (instream), not at a later time from collected samples.

The City will perform quarterly sampling at approximately the following dates:

- Q1 Event: Second week of March (reporting by April 15)
- Q2 Event: Second week of June (reporting by July 15)
- Q3 Event: Second week of September (reporting by October 15)
- Q4 Event: Second week of December (reporting by January 15)

3.3 Monitoring and Sample Collection Methods

The following section outlines the procedures that will be used to record river water quality conditions in the field, collect surface water samples, and transport the samples to the lab for testing.

3.3.1 Field Recording and Documentation

Observations and actions during quarterly monitoring and sampling events will be recorded in daily activity logs and sampling logs. Example field forms have been prepared for use by City staff during sampling events (see examples in Appendix B). Forms will be duplicated and stored in digital and physical copies at the City WWTP office.

One of the required surface water parameters to record and report is total flow in millions of gallons per day (MGD). Based on the conditions of the amended WPCF Permit, the City will use data from the USGS gage at the upstream monitoring location to represent general flow conditions in the river. City staff will record the flow conditions in cubic feet per second (CFS) at the USGS gage at the time of sampling and will calculate an estimated total flow in MGD from that value. For example, if the flow rate recorded at the gage at the time of sampling was 75 cfs, then the total flow reported would be 48.5 MGD.

$$Total\ Flow\ (MGD) = Flow\ Rate\ (CFS) * 448.83\ \left(\frac{GPM}{CFS}\right) * 1440\ \left(\frac{min}{day}\right)$$

3.3.2 Instrument Care and Calibration

Three surface water quality parameters will be regularly measured in the field using portable field meters: temperature, pH, and dissolved oxygen (DO). Field thermometers do not require regular calibration. The probes used to measure pH and DO will be calibrated within no more than 48 hours of the sampling event. Calibration of field meters will follow the manufacturer's recommendations and frequencies and will be used in compliance with operating instructions and decontamination procedures.

All field measurement and sampling equipment will be decontaminated after each use.

3.3.3 Equipment Decontamination Procedures

In order to minimize the chances of cross-contamination, equipment must be appropriately cleaned in between sampling events and well sites. Non-dedicated equipment, such as water level meters and probes used for various sites and applications, should be decontaminated before and after use for the surface water monitoring program. Non-dedicated equipment used for measurement but not involved in sampling (water level meter, field probes, etc.) will be decontaminated between sampling events using the following procedure:

- Wipe with a clean paper towel,
- Rince with potable water,
- Wash with a lab-grade detergent such as Alconox,
- Rince with distilled or filtered water.

Unlike in the groundwater monitoring program, there is no required sampling equipment to collect surface water samples. Grab samples will be collected by hand by directly filling sample bottles from the river. Care will be taken to avoid stagnant water (at low-flow periods) and sediment when collecting grab samples.

3.3.4 Sample Measurement and Collection

A list of proposed field monitoring equipment is included in Appendix C.

Surface water samples will be collected directly from the river. Sample bottles will be lowered into the river while angled downstream until water begins to flow into the bottle. If the staff collecting the sample must wade into the river, the sample bottle will be filled on the upstream side of where the sampler is standing.

Care should be taken not to splash water into the bottles or introduce air into the sample. Samples should not be transferred from one sample container to another to avoid cross-contamination and aeration of the sample. Samples will be collected in a manner that reduces the risk of sample contamination, including:

- Opening the sample bottles only immediately before the sample is collected.
- Minimizing agitation of the sample bottles once placed in the transport container.

Each sample bottle will have a label containing the following information in permanent marker:

- Sample site number,
- Sample ID number,
- Date and time of collection,
- Sampler's initials,
- Analytical lab receiving the samples.

The personnel collecting the samples will enter matching information on the Surace Water Sampling field form and the chain-of-custody (COC) form (Appendix B). A lab-provided COC form will also be filled out and included with the samples in the transport container. Once the samples are collected and stored, the well will be secured. Sample handling and COC procedures are discussed further in Section 3.5.1.

Additional Quality Control samples will be collected during each sampling event. These samples are described in Section 3.5.2.

3.4 Analytical Methods

The following section describes the analytical methods proposed for use in the surface water sampling program. Multiple methodologies may be listed for one parameter. The laboratories under consideration by the City offer different or multiple analytical methods that are commonly applied in environmental monitoring.

3.4.1 Laboratory Methodologies

The proposed analytical methods for laboratory-tested groundwater samples are listed in Table 2.

Table 2 – Analytical Methods for Required Groundwater Monitoring Parameters

Required Groundwater Testing Parameter	Analytical Method(s) Proposed	Sample Holding Time
Biological Oxygen Demand (BOD_5)	SM 5210 B	24 Hours
Total Nitrogen (Total-N)	SM 4500-Norg B / EPA 300.0	7 Days / 48 Hours
E. Coli	SM 9223 B	24 Hours

**Based on data from the National Environmental Methods Index*

3.5 Quality Assurance and Quality Control

The following section outlines the steps taken in the surface water monitoring program to ensure data quality from samples delivered to the analytical laboratory.

3.5.1 Sample Handling and Chain of Custody

Possession and transport of surface water samples will be traceable from the time of sample collection in the field to the receiving laboratory. Documentation begins at sample collection with proper labeling on sampling

containers, annotation on field forms, and by filling out a laboratory-supplied COC form. The COC forms will be included with the sample bottles in the transport container.

Surface water samples that are sent to an analytical laboratory for analysis will be placed in a cooler containing ice or ice packs to maintain a maximum sample temperature of 4°C. Once sample bottles are sealed in the field, they will not be reopened until they are received at the lab and are processed for analysis. The sample cooler will be transported to the receiving laboratory on the same day as the samples are collected.

3.5.2 Quality Control Sampling

In addition to samples from the surface water monitoring points and wells from the groundwater monitoring network, two additional Quality control and quality assurance (QA/QC) samples will be collected and analyzed for the analytical parameters. The QA/QC samples are meant to assess the variability introduced in sampling, handling, and analysis. One of each of the following sample types will be collected during each quarterly sampling event:

- Duplicate – One sampling site, between the surface water and groundwater monitoring sites, will be randomly selected during each quarterly sampling event. A duplicate sample will be collected at the same time as the primary sample and will be labeled as a duplicate. The sample will be processed and tested at the lab along with the other samples. The duplicate sample provides information on laboratory analysis variability.
- Field Blank – One field blank will be collected during each quarterly sampling event. The field blank will be a sample bottle filled with distilled water at a randomly selected well site. The blank sample will be labeled as such and will be processed and tested at the lab along with the other samples. The field blank provides information on potential environmental contamination due to ambient conditions.

3.5.3 Laboratory Quality Assurance

The laboratory selected and used for analytical testing will follow the current National Environmental Laboratory Accreditation Program standards and carry accreditation from the State of Oregon through their environmental laboratory accreditation program.

The City intends to utilize the services of either Umpqua Research Laboratory in Bend, OR (accreditation #OR100052) or Edge Analytical Laboratory in Bend, OR (accreditation #4075-007) for the analysis of regular groundwater samples.

4 Data Analysis and Reporting Procedures

The Oregon DEQ requires that surface water monitoring reports and testing results be submitted by the 15th day of the month following the end of the quarter. Like with sampling events, the City will stive to submit surface water monitoring reports to the DEQ on a regular schedule and within this due date. Each quarter's monitoring report shall present the surface water monitoring activities performed at the City's WWTP facilities. All reports will be prepared in compliance with the surface water monitoring requirements of the City's WPCF Permit and this Plan. The reports will be submitted to the DEQ contact person, provided by the DEQ, in an appropriate digital format.

4.1 Statistical Analysis

Quarterly surface water monitoring reports will include information on the condition of the monitoring points, parameters measured in the field and analyzed in the lab, notes on sample collection and handling activities, and a map of the monitoring network. Reports will also include numerical and graphical presentations of water quality data. Copies of the original lab reports will be included in reports as appendices.

Analytical methods applied to surface water reporting will change over time as more data points become available. For example, performing most statistical analysis will not be possible until at least four quarters of data are collected. However, early monitoring data will be compared to available background data collected from the river prior to WWTP operations and will be discussed in the context of establishing baseline water quality ranges for each parameter.

4.1.1 Analytical Methods & Frequency of Analysis

The water quality values measured in the field and laboratory during each quarterly sampling event will be compared to the mean or median (dependent on normality) and overall range of all previous measurements for that parameter. After at least four quarters of data are available, a ***Shapiro-Wilkes*** analysis will be used to determine if sampling data are normal. Parameters exhibiting a normal distribution will be compared by mean, while non-parametric datasets will be compared by median. Early sampling data is assumed to be nonparametric and will be compared by median.

Each quarter's data will be compared to past and concurrent data in multiple ways. For example, the BOD_5 value for a given sampling site and event will be evaluated by:

- Comparing the value to all background surface water data,
- Comparing the value to all previous post-background sampling values across both surface water sites,
- Comparing the value to all previous values at the same sampling site,
- Comparing the value to all previous data from that sampling quarter (seasonal comparison),
- Comparing the value to value from other surface water site during that sampling event.

Evaluating the data as stated above will allow the City to identify continuous trends, seasonal trends, spatial trends, and outlier events in water quality. Outlier events will be identified by performing a ***one sample t-test*** or similar statistical analysis to determine if a value is significantly different than the previously measured values. Once enough data are collected, groundwater level and water quality values will be analyzed on a timescale basis. Simple linear regression or similar statistical analyses will be applied to determine if there are long-term temporal trends.

The Permit requires surface water monitoring to ensure that water quality is not negatively impacted by the wastewater infiltration activities. No direct parameter limits are defined in the Permit. Therefore, analysis of the measured water quality values over time will be key in determining if surface water quality is being protected. Statistical analysis of surface water sampling data will be performed on a quarterly basis following sample collection and analysis.

APPENDIX A

CITY OF JOHN DAY WPCF PERMIT

Oregon
Tina Kotek, Governor

Department of Environmental Quality
Eastern Region Pendleton Office
800 SE Emigrant Ave., Ste. 330
Pendleton, OR 97801
541-276-4063

March 13, 2023

Casey Myers
City of John Day
450 E Main Street
John Day, OR 97845
myersc@grantcounty-or.gov

RE: Modification #1 Issuance of WPCF-DOM-C2a Permit # 103281
File # 127619
Facility: John Day Wastewater Treatment Facility, 700 NW 7th Ave., John Day
Grant County

This permit is issued based on the land use findings in the permit record. This minor modification was initiated to include updates to Schedule B of the permit.

Your Water Pollution Control Facilities Permit has been modified and is enclosed. Your permit modification is effective on March 13, 2023.

Please read your permit carefully and reference both your permit and permit modification to ensure compliance and reporting obligations are met. Compliance with your permit is required at all times.

If you are dissatisfied with the conditions of this permit, you have 20 days to request a hearing before the Environmental Quality Commission or its authorized representative. A request for a hearing must be made in writing and state the grounds for the request. Any hearing will be conducted as a contested case hearing in accordance with ORS 183.413 through 183.470 and OAR chapter 340, division 011. If a hearing is requested, the existing permit continues in effect until a final order is issued.

Please contact your permit inspector, Justin Sterger, at: justin.sterger@deq.oregon.gov or 541-633-2016 if you have any questions about your permit requirements.

Sincerely,

Mike Hiatt
Water Quality Manager
Eastern Region

MH:pi

Attached: Permit Modification #1, Permit Modification #1 Fact Sheet
cc: Regional File, Pendleton DEQ
ec: DEQ Data Team, DEQ w/permit
ORMS

State of Oregon
Department of
Environmental
Quality

Water Pollution Control Facility
Permit Fact Sheet – Modification #1
City of John Day

Permittee	City of John Day John Day 450 East Main John Day, OR 97845
Existing Permit Information	File Number: 127619 Referenced F43569 Permit Number:103281 Referenced P102481 Category: Domestic Class: Minor Expiration Date: March 31, 2032
Permittee Contact	Casey Myers – Public Works Director myersc@grantcounty-or.gov 541-620-3090 450 East Main St. John Day, OR 97845
Nearest Water Waterbody	Water Body Name: John Day River River Mile: 248.0 Sub Basin Name: Upper John Day Basin Name: John Day
Proposed Action	Minor WPCF Permit Modification
Permit Writer	Justin Sterger 541-633-2016 Date Prepared: March 2023

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WPCF Permit Fact Sheet – Modification #1
City of John Day

1. Introduction

The Oregon Department of Environmental Quality (DEQ) proposes to modify the Water Pollution Control Facilities (WPCF) permit for the City of John Day wastewater treatment facility located at 700 NW 7th Avenue in John Day, OR 97845. The assigned permit allows and regulates the treatment and discharge of domestic wastewater from a new treatment plant (sequencing batch reactor with ultraviolet disinfection) to rapid infiltration basins.

The purpose of this fact sheet is to explain and provide justification for the proposed modifications to the existing permit.

2. Permit History

WPCF Permit #103281 was issued to the facility on April 18th, 2022 and the permit went into effect on May 1, 2022. The facility has not yet been constructed at the time of this permit modification.

The purpose of the permit modification is to complete minor typographical edits in the permit regarding required dates of collection of groundwater and surface water data and submittal of monthly reports after the new facility is constructed.

3. Proposed Permit Modification

This permit modification was based upon a request for clarification in start dates for surface water monitoring and groundwater monitoring as the permittee develops the required plans for DEQ review. DEQ also clarified specific use of upstream flow gauge for surface water monitoring.

3.1 Revisions to Schedule B

The proposed revisions to Schedule B are listed below:

3.1.1 Reporting Requirements

The permittee must submit to DEQ monitoring results and reports as listed below.

Table B1: Reporting Requirements and Due Dates

Reporting Requirement	**Frequency**	**Due Date** (See Note a.)	**Report Form** (See Note b.)	**Submit To:** (See Note c & d)
Tables B2 and B3 Influent Monitoring and Effluent Monitoring	Monthly	By the 15th of the following month (See Note f)	Specified in Schedule B. Section 2 of this permit	As directed by DEQ
Groundwater Monitoring Plan	One Time	12 months after permit effective date	Electronic copy in a DEQ-approved format	As directed by DEQ
Groundwater Monitoring	Quarterly	By the 15th of the following month after quarter end (See Note e).	Electronic copy in the DEQ-approved form	As directed by DEQ
Surface Water Monitoring Plan	One Time	12 months after permit effective date	Electronic copy in a DEQ-approved format	As directed by DEQ
Surface water monitoring	Quarterly	By the 15th of the following month after quarter end (See Note e).	Electronic copy in the DEQ-approved form	As directed by DEQ
Recycled Water Annual Report (see Schedule D)	Annually	January 15 (See Note f)	Electronic copy in the DEQ-approved format	As directed by DEQ Electronic copy to DEQ Water Reuse Program Coordinator
Biosolids annual report (See Schedule D)	Annually	February 19 (See Note f)	Electronic copy in the DEQ-approved form	As directed by DEQ DEQ Biosolids Program Coordinator

Reporting Requirement	Frequency	Due Date (See Note a.)	Report Form (See Note b.)	Submit To: (See Note c & d)
Inflow and infiltration report (see Schedule D)	Annually	February 15 (See Note f)	Electronic copy in a DEQ-approved format	As directed by DEQ
Industrial User Survey (see Schedule D)	One Time	January 15, 2024	Electronic copy in a DEQ-approved format	As directed by DEQ Electronic copy to DEQ Pretreatment Program Coordinator
Hauled Waste Control Plan (see Schedule D)	One time	Submit prior to accepting hauled waste	Electronic copy in a DEQ-approved format	As directed by DEQ
Hauled Waste Annual Report (see Schedule D)	Annually	January 15 (See Note f)	Electronic copy in the DEQ-approved format	As directed by DEQ

Notes:

a. For submittals that are provided to DEQ by mail, the postmarked date must not be later than the due date.
b. All reporting requirements are to be submitted in a DEQ approved format, unless otherwise specified in writing.
c. Electronic reporting information is provided on DEQ's web page (https://www.oregon.gov/deq/wq/wqpermits/Pages/NPDES-E-Reporting.aspx).
d. Email address for biosolids and recycled water coordinator are provided on DEQ's biosolids web page (https://www.oregon.gov/deq/wq/programs/Pages/Biosolids.aspx).
e. Monitoring requirements will begin at least six months prior to startup of the upgraded facility and after DEQ approves the city's plan.
f. Monitoring and reporting will begin after the updated facility begins operations

3.1.2 Surface Water Monitoring Requirements

The permittee must monitor surface water of the John Day River as listed below. The samples must be representative of the water flowing in the John Day River at the designated locations. Samples will be collected from the upstream site and downstream site for each sampling event except for total flow which will be collected from the USGS John Day River gauge 14038530. These samples will be collected at the locations identified in the Surface Water Monitoring Plan. The permittee may request a reduction or termination of this sampling effort after collection of three full years of data if the data clearly shows no evidence of discharge of pollutants from the facility to surface water.

Table B8: Surface Water Monitoring

Item or Parameter	Minimum Frequency	Sample Type/ Required Action	Report
Total Flow (MGD)	Quarterly	Measurement	Annual Report
Dissolved Oxygen	Quarterly	Measurement	Annual Report
pH	Quarterly	Measurement	Annual Report
Temperature	Quarterly	Measurement	Annual Report
E. coli	Quarterly	Grab	Annual Report
Total Nitrogen	Quarterly	Grab	Annual Report
BOD_5	Quarterly	Grab	Annual Report

4. Next Steps

The proposed WPCF permit modification is considered a Category I permit action per OAR 340-045-0027.

The modification will become effective upon mailing unless the permittee requests a hearing within 20 days. A permittee must request a hearing in writing and state the grounds for the request. See OAR 340-045-0055.

WATER POLLUTION CONTROL FACILITIES PERMIT

Oregon Department of Environmental Quality
Eastern Region – Pendleton Office
800 SE Emigrant, #330
Pendleton, OR 97801
Telephone: 541-276-4063

Issued pursuant to ORS 468B.050

ISSUED TO:	SOURCES COVERED BY THIS PERMIT:		
City of John Day 450 East Main St. John Day, OR 97845	**Type of Waste**	**Outfall Number**	**Location**
	Domestic Wastewater	001	Lat: 44.42221 Long: -118.97070
	Recycled Water	002	Specified in Recycled Water Use Plan
	Biosolids	003	Specified in Biosolids Management Plan

FACILITY TYPE AND LOCATION:

Sequencing batch reactor with ultraviolet disinfection
700 NW 7th Ave
John Day, OR 97845
County: Grant

RIVER BASIN INFORMATION:

WRD Basin: John Day

USGS Sub-Basin: 170702010902 Upper John Day
Nearest surface water body name: John Day River
LLID: 1206499457318
John Day at RM 248.0

File: 43569 permit 102481 referenced.
Issued in response to Application No. 948631 received December 7, 2021. This permit is issued based on the land use findings in the permit record.

Shannon Davis

Shannon Davis, Acting Water Quality Manager
Eastern Region

4-18-2022
Issuance Date

5-1-2022
Effective Date

PERMITTED ACTIVITIES

Until this permit expires or is modified or revoked, the permittee is authorized to construct, install, modify or operate a wastewater collection, treatment, control and disposal system in conformance with the requirements, limits, and conditions set forth in this permit.

Unless specifically authorized by this permit, by another NPDES or WPCF permit, or by Oregon statute or administrative rule, any direct or indirect discharge of pollutants to waters of the state is prohibited.

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SCHEDULE A: WASTE DISCHARGE LIMITS

1. Permitted System

The City of John Day is authorized to operate and maintain a domestic wastewater treatment facility consisting of a sequencing batch reactor with tertiary filters and ultraviolet light disinfection with an average dry weather flow of 0.3 MGD. Treated effluent will be discharged to rapid infiltration basins or utilized for beneficial purpose as recycled water in accordance with a DEQ approved Recycled Water Use Plan (RWUP).

2. Effluent Limits for Outfall 001

During the term of this permit, the permittee must comply with the effluent limits in Table A1 for discharge into the rapid infiltration basins. Monitoring point must be located after the UV treatment but just prior to discharge to the rapid infiltration basins.

Table A1: Outfall 001 Limits

Parameter	Units	Monthly Average	Weekly Average	Single sample Maximum
BOD_5	mg/L	20	35	--
TSS	mg/L	20	35	--
Total nitrogen	mg/L	5	--	9
E. coli	organisms/100ml	126 (geometric mean)	--	406[a]
pH	SU	Instantaneous limit between a daily minimum of 6.5 and a daily maximum of 8.5		

Note:

a. No single *E. coli* sample may exceed 406 organisms per 100 mL; however, DEQ will not cite a violation of this limit if the permittee takes at least 5 consecutive re-samples at 4 hour intervals beginning within 28 hours after the original sample was taken and the geometric mean of the 5 re-samples is less than or equal to 126 *E. coli* organisms/100mL.

3. Surface Water Protection

Direct discharge to navigable waters as defined in OAR Chapter 340 Division 045 Section 0010 (13) is prohibited.

4. Groundwater Protection

Any activity that has an adverse effect on existing or potential beneficial uses of groundwater is prohibited. All wastewater and wastewater solids must be managed and disposed in a manner that will prevent a violation of the Groundwater Quality Protection Rules (OAR Chapter 340, Division 40). If warranted, at any time, DEQ may evaluate the need for or require a full assessment of the facility's effect on groundwater quality.

The permittee must conduct routine groundwater monitoring as specified in the facility's DEQ approved Groundwater Monitoring Plan.

5. Use of Recycled Water

The permittee is authorized in OAR Chapter 340 Division 055 Section 0012 to distribute recycled water if it is:

a. Treated and used according to the criteria listed in Table A2.

b. Managed in accordance with its DEQ-approved Recycled Water Use Plan unless exempt as provided in Schedule D.

c. Used in a manner and applied at a rate that does not adversely affect groundwater quality.

d. Applied at a rate and in accordance with site management practices that ensure continued agricultural, horticultural, or silvicultural production and does not reduce the productivity of the site.

e. Irrigated using sound irrigation practices to prevent:

i. Offsite surface runoff or subsurface drainage through drainage tile;

ii. Creation of odors, fly and mosquito breeding, or other nuisance conditions; and

iii. Overloading of land with nutrients, organics, or other pollutants.

Table A2: Recycled Water Limits

Class	Level of Treatment (after disinfection unless otherwise specified)	Beneficial Uses
A.	Class A recycled water must be oxidized, filtered and disinfected. Before disinfection turbidity may not exceed: • An average of 2 NTUs within a 24-hour period. • 5 NTUs more than five percent of the time within a 24-hour period. • 10 NTUs at any time. After disinfection, total coliform may not exceed: • A median of 2.2 organisms per 100 mL based on daily sampling over the last 7 days that analyses have been completed. • 23 organisms per 100 mL in any single sample.	Class A recycled water approved uses: • Class B, Class C, Class D, and nondisinfected uses. • Irrigation for any agricultural or horticultural use. • Landscape irrigation of parks, playgrounds, school yards, residential landscapes, or other landscapes accessible to the public. • Commercial car washing or fountains when the water is not intended for human consumption. • Water supply source for non-restricted recreational impoundments.
B.	Class B recycled water must be oxidized and disinfected. Total coliform may not exceed: • A median of 2.2 organisms per 100 mL, based on the last 7 days that analyses have been completed. • 23 total coliform organisms per 100 mL in any single sample.	Class B recycled water approved uses: • Class C, Class D, and nondisinfected uses. • Stand-alone fire suppression systems in commercial and residential building, non-residential toilet or urinal flushing, or floor drain trap priming. • Water supply source for restricted recreational impoundments.

6. Agronomic rates for Nutrient Loading

Crop and site specific agronomic loading rates for nutrients will be approved by DEQ only after consideration of agronomic rates published in appropriate, region specific, fertilizer guides and proposed by the Permittee. DEQ may require adjustment to the allowable agronomic rates after review of annual reporting and to ensure adequate protection of public waters, including groundwater. The Recycled Water Use Plan must list the approved agronomic rates for each proposed crop

7. Biosolids

The permittee may land apply biosolids or provide biosolids for sale or distribution, subject to OAR 340; Division 50 and 40 CFR Part 503, and the following conditions:

a. The permittee must manage biosolids in accordance with its DEQ-approved Biosolids Management Plan and Land Application Plan.

b. The permittee must apply biosolids at or below the agronomic rates approved by DEQ in order to minimize potential groundwater degradation. DEQ may require adjustment to the allowable agronomic rate after review of annual reporting and to ensure adequate protection of public waters, including groundwater.

c. The permittee must obtain written site authorization from DEQ for each land application site prior to land application (see Schedule D) and follow the site-specific management conditions in the DEQ-issued site authorization letter.

d. Prior to application, the permittee must ensure that biosolids meet one of the pathogen reduction standards under 40 CFR 503.32 and one of the vector attraction reduction standards under 40 CFR 503.33.

e. The permittee must not apply biosolids containing pollutants in excess of the ceiling concentrations shown in the table below. The permittee may apply biosolids containing pollutants in excess of the pollutant concentrations, but below the ceiling concentrations, however, the total quantity of pollutant applied cannot exceed the cumulative pollutant loading rates in the table below.

Table A3: Biosolids Limits

Pollutant See note a.	**Ceiling concentrations (mg/kg)**	**Pollutant concentrations (mg/kg)**	**Cumulative pollutant loading rates (kg/ha)**
Arsenic	75	41	41
Cadmium	85	39	39
Copper	4300	1500	1500
Lead	840	300	300
Mercury	57	17	17
Molybdenum	75	N/A	N/A
Nickel	420	420	420
Selenium	100	100	100
Zinc	7500	2800	2800

Note:
a. Biosolids pollutant limits are described in 40 CFR 503.13, which uses the terms *ceiling concentrations*, *pollutant concentrations*, and *cumulative pollutant loading rates*.

SCHEDULE B: MINIMUM MONITORING AND REPORTING REQUIREMENTS

1. Reporting Requirements

The permittee must submit to DEQ monitoring results and reports as listed below.

Table B1: Reporting Requirements and Due Dates

Reporting Requirement	Frequency	Due Date (See Note a.)	Report Form (See Note b.)	Submit To: (See Note c & d)
Tables B2 and B3 Influent Monitoring and Effluent Monitoring	Monthly	By the 15th of the following month	Specified in Schedule B. Section 2 of this permit	As directed by DEQ
Groundwater Monitoring Plan	One Time	12 months after permit effective date	Electronic copy in a DEQ-approved format	As directed by DEQ
Groundwater Monitoring	Quarterly	By the 15th of the following month after quarter end (See Note e).	Electronic copy in the DEQ-approved form	As directed by DEQ
Surface Water Monitoring Plan	One Time	12 months after permit effective date	Electronic copy in a DEQ-approved format	As directed by DEQ
Surface water monitoring	Quarterly	By the 15th of the following month after quarter end (See Note e).	Electronic copy in the DEQ-approved form	As directed by DEQ
Recycled Water Annual Report (see Schedule D)	Annually	January 15	Electronic copy in the DEQ-approved format	As directed by DEQ Electronic copy to DEQ Water Reuse Program Coordinator
Biosolids annual report (See Schedule D)	Annually	February 19	Electronic copy in the DEQ-approved form	As directed by DEQ DEQ Biosolids Program Coordinator
Inflow and infiltration report (see Schedule D)	Annually	February 15	Electronic copy in a DEQ-approved format	As directed by DEQ
Industrial User Survey (see Schedule D)	One Time	January 15, 2024	Electronic copy in a DEQ-approved format	As directed by DEQ Electronic copy to DEQ Pretreatment Program Coordinator
Hauled Waste Control Plan (see Schedule D)	One time	Submit prior to accepting hauled waste	Electronic copy in a DEQ-approved format	As directed by DEQ

Reporting Requirement	Frequency	Due Date (See Note a.)	Report Form (See Note b.)	Submit To: (See Note c & d)
Hauled Waste Annual Report (see Schedule D)	Annually	January 15	Electronic copy in the DEQ-approved format	As directed by DEQ

Notes:
a. For submittals that are provided to DEQ by mail, the postmarked date must not be later than the due date.
b. All reporting requirements are to be submitted in a DEQ approved format, unless otherwise specified in writing.
c. Electronic reporting information is provided on DEQ's web page (https://www.oregon.gov/deq/wq/wqpermits/Pages/NPDES-E-Reporting.aspx).
d. Email address for biosolids and recycled water coordinator are provided on DEQ's biosolids web page (https://www.oregon.gov/deq/wq/programs/Pages/Biosolids.aspx).
e. Monitoring requirements will not begin until after DEQ approves the city's plan

2. Monitoring and Reporting Protocols

a. **Paper Submissions.**

When submitting paper copies as required by table B1, the permittee must submit to DEQ the results of the monitoring in a paper format as specified below.

i. Until directed by DEQ all Discharge Monitoring Reports (DMRs) must be submitted in an approved paper format:

(A) The reporting period is the calendar month.

(B) The permittee must submit monitoring data and other information required by this permit for all compliance points by the 15th day of the month following the reporting period unless specified otherwise in this permit or as specified in writing by DEQ.

ii. Until directed by DEQ, the permittee must submit any required Pretreatment Program Reports, Wastewater Solids and Biosolids Annual Report, Recycled Water Annual Report, Sanitary Sewer Overflow/Bypass Event Reports, and other required information to DEQ.

iii. The permittee must sign and certify submittals of Discharge Monitoring Reports (DMRs), reports, and other information in accordance with the requirements of Section D8 within Schedule F of this permit.

b. **Electronic Submissions.**

When submitting electronic copies as required by table B1, the permittee must submit to DEQ the results of monitoring in an electronic format as specified below.

i. When directed by DEQ, the permittee must submit monitoring results required by this permit via DEQ-approved web-based Electronic Discharge Monitoring Report (DMR) forms.

ii. The reporting period is the calendar month.

iii. The permittee must submit monitoring data and other information required by this permit for all compliance points by the 15th day of the month following the reporting period unless specified otherwise in this permit or as specified in writing by DEQ.

iv. When directed by DEQ, the permittee must submit electronic reports for any required Pretreatment Program Reports, Wastewater Solids and Biosolids Annual Report, Recycled Water Annual Report, Sewer Overflow/Bypass Event Reports, and other required information to DEQ via designated web-based reporting process.

c. **Test Methods.**

The permittee must conduct monitoring according to test procedures in 40 CFR part 136 and 40 CFR part 503 for biosolids or other approved procedures as per Schedule F.

d. **Detection and Quantitation Limits**

i. Detection Level (DL) – The DL is defined as the minimum measured concentration of a substance that can be distinguished from method blank results with 99% confidence. The DL is derived using the procedure in 40 CFR part 136 Appendix B and evaluated for reasonableness relative to method blank concentrations to ensure results reported above the DL are not a result of routine background contamination. The DL is also known as the Method Detection Limit (MDL) or Limit of Detection (LOD).

ii. Quantitation Limits (QLs) – The QL is the minimum level, concentration or quantity of a target analyte that can be reported with a specified degree of confidence. It is the lowest level at which the entire analytical system gives a recognizable signal and acceptable calibration for the analyte. It is normally equivalent to the concentration of the lowest calibration standard adjusted for sample weights, volumes, preparation and cleanup procedures employed. The QL as reported by a laboratory is also sometimes referred to as the Method Reporting Limit (MRL) or Limit of Quantitation (LOQ).

iii. For compliance and characterization purposes, the maximum acceptable QL is stated in this permit.

e. **Implementation**

The Laboratory QLs (adjusted for any dilutions) for analyses performed to demonstrate compliance with permit limits or as part of effluent characterization, must be at or below the QLs specified in the permit unless one of the conditions below is met.

i. The monitoring result shows a detect above the laboratory reported QL.

ii. The monitoring result indicates non-detect at a DL which is less than the QL.

iii. Matrix effects are present that prevent the attainment of QLs and these matrix effects are demonstrated according to procedures described in EPA's "Solutions to Analytical Chemistry Problems with Clean Water Act Methods", March 2007. If using alternative methods and taking appropriate steps to eliminate matrix effects does not eliminate the matrix problems, DEQ may authorize in writing re-sampling or allow a higher QL to be reported. In the case of effluent characterization monitoring,

f. **Quality Assurance and Quality Control**

i. Quality Assurance Plan – The permittee must develop and implement a written Quality Assurance Plan that details the facility sampling procedures. This plan should include any equipment calibration and maintenance, analytical methods, quality control activities and laboratory data handling and reporting if the permittee conducts any of their own analytical work. The QA/QC program must conform to the requirements of 40 CFR 136.7.

ii. If QA/QC requirements are not met for any analysis, the permittee must re-analyze the sample. If the sample cannot be re-analyzed, the permittee must re-sample and analyze at the earliest opportunity. If the permittee is unable to collect a sample that meets QA/QC requirements, then the permittee must include the result in the discharge monitoring report (DMR) along with a notation (data qualifier). In addition, the permittee must explain how the sample does not meet QA/QC requirements. The permittee may not use the result that failed the QA/QC requirements in any calculation required by the permit unless authorized in writing by DEQ.

iii. Flow measurement, field measurement, and continuous monitoring devices - The permittee must:

(A) Establish verification and calibration frequency for each device or instrument in the quality assurance plan that conforms to the frequencies recommended by the manufacturer.

(B) Verify at least once per year that flow-monitoring devices are functioning properly according to manufacturer's recommendation. Calibrate as needed according to manufacturer's recommendations.

(C) Verify at least weekly that the continuous monitoring instruments are functioning properly according to manufacturer's recommendation unless the permittee demonstrates a longer period is sufficient and such longer period is approved by DEQ in writing.

g. **Reporting Sample Results**

i. The permittee must report the same number of significant digits as the permit limit for a given parameter.

3. Monitoring and Reporting Requirements

a. The permittee must monitor influent at the headworks to the treatment plant and report results in accordance with the table below:

Table B2: Influent Monitoring Requirements

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type / Required Action See note b.	Report Statistic See note a.
Flow (50050)	MGD	Year-round	Daily	Metered	Monthly Average Daily Maximum
BOD_5 (00310)	mg/L	Year-round	Once per Week	24 Hour Composite[c]	Monthly Average
TSS (00530)	mg/L	Year-round	Once per Week	24 Hour Composite[c]	Monthly Average
pH (00400)	Standard Units SU	Year-round	Once per Week	Grab	Monthly Maximum Monthly Minimum
Hauled Waste	Gallons	Year-round	Daily	Amount Received	Monthly Total

Notes:

a. When submitting DMRs electronically, all data used to determine summary statistics shall be submitted in a DEQ approved format unless otherwise directed by DEQ. If submitting paper DMRs, all data collected shall be reported on each DMR.

b. In the event of equipment failure or loss, the permittee must notify DEQ and repair or replace effected equipment to minimize interruption of data collection. If the equipment cannot be immediately repaired or replaced, the permittee must perform grab measurements daily

c. Composite samples shall consist of no less than 6 samples collected over a 24-hour period and apportioned according to the volume of flow at the time of sampling.

b. The permittee must monitor effluent at Outfall 001 prior to discharge to infiltration basins and report results in accordance with Table B1 and the table below:

Table B3: Effluent Monitoring Requirements

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action See note b.	Report Statistic See note a.
Flow (50050)	MGD	Year-round	Daily	Metered	Monthly Average Daily Maximum
Temperature (00010)	ºC	Year-round	Daily	Metered	Monthly Average Daily Maximum
BOD_5 (00310)	mg/L	Year-round	Once per Week	24-hour composite[c]	Monthly Average Weekly Average
TSS (00530)	mg/L	Year-round	Once per Week	24-hour composite[c]	Monthly Average Weekly Average
pH (00400)	Standard Units (SU)	Year-round	Once per Week	Grab	Daily Maximum Daily Minimum
E. coli (51040)	#/100 mL	Year-round	Once per Week	Grab	Daily Maximum Monthly Median
UV intensity (49607)	mW/cm^2	Year-round	Daily	Continuous	Daily Minimum
UV dose (61938)	(mJ/cm^2)	Year-round	Daily	Calculation	Daily Minimum
UV transmittance (51043)	%	Year-round	Daily	Continuous	Daily Minimum
Total Kjeldahl Nitrogen (TKN) (00625)	mg/L	Year-round	Quarterly	Grab	Quarterly Maximum
Nitrate (NO3) Plus Nitrite (NO2) Nitrogen (00630)	mg/L	Year-round	Quarterly	Grab	Quarterly Maximum
Total Ammonia (as N) (00610)	mg/L	Year-round	Quarterly	Grab	Quarterly Maximum
Total Nitrogen (00600)	mg/L	Year-round	Monthly	Calculated	Monthly
Total Phosphorus (00665)	mg/L	Year round	Monthly	Grab	Monthly
Total Dissolved Solids (70295)	mg/L	Year-round	Quarterly	Grab	Quarterly Maximum

Item or Parameter	Units	Time Period	Minimum Frequency	Sample Type/ Required Action See note b.	Report Statistic See note a.

Notes:
a. When submitting DMRs electronically, all data used to determine summary statistics shall be submitted in a DEQ approved format as an attachment unless otherwise directed by DEQ. If submitting paper DMRs, all data collected shall be reported on each DMR.
b. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must perform grab measurements. If the failure or loss is for continuous temperature monitoring equipment, the permittee must perform grab measurements daily between 2 PM and 4 PM until continuous monitoring equipment is redeployed.
c. Composite samples shall consist of no less than 6 samples collected over a 24-hour period and apportioned according to the volume of flow at the time of sampling.

4. Recycled Water Monitoring Requirements: Outfall 002

The permittee must monitor recycled water for Outfall 002 as listed below only when distributing recycled water. The samples must be representative of the recycled water delivered for beneficial reuse at each location identified in the Recycled Water Use Plan.

Table B4: Recycled Water Monitoring

Item or Parameter	Minimum Frequency	Sample Type/ Required Action	Report
Total Flow (MGD)	Daily	Measurement	Annual Report and monthly
Quantity Irrigated (inches/acre)	Daily	Calculation	Annual Report and monthly per field
pH	2/Week	Grab	Annual Report and monthly
Total Coliform	Daily	Grab	Annual Report and monthly
Turbidity (Class A)	Hourly	Measurement	Annual Report and monthly
Total Nitrogen Loading Rate (lbs/acre-year)	Annually	Calculation	Annual Report
Supplemental Fertilizer Applied	As applied	Record Amounts	Annual Report
Nutrients (TKN, NO2+NO3-N, Total Ammonia (as N), Total Phosphorus)	Quarterly	Grab	Annual Report and monthly

5. Biosolids Monitoring Requirements

The permittee must monitor biosolids land applied or produced for sale or distribution as listed below. The samples must be representative of the quality and quantity of biosolids generated and undergo the same treatment process used to prepare the biosolids.

Table B5: Biosolids Monitoring

Item or Parameter	Minimum Frequency	Sample Type
Nutrient and conventional parameters (% dry weight unless otherwise specified): Total Kjeldahl Nitrogen (TKN) Nitrate-Nitrogen (NO_3-N) Total Ammoniacal Nitrogen (NH-N) Total Phosphorus (P) Potassium (K) pH (S.U.) Total Solids Volatile Solids	As described in the DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B6.	As described in the DEQ-approved Biosolids Management Plan
Pollutants: As, Cd, Cu, Hg, Pb, Mo, Ni, Se, Zn, mg/kg dry weight	As described in the DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B6	As described in the DEQ-approved Biosolids Management Plan
Pathogen reduction	As described in the DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B6.	As described in the DEQ-approved Biosolids Management Plan
Vector attraction reduction	As described in the DEQ-approved Biosolids Management Plan, but not less than the frequency in Table B6.	As described in the DEQ-approved Biosolids Management Plan
Record of biosolids land application: date, quantity, location.	Each event	Record the date, quantity, and location of biosolids land applied on site location map or equivalent electronic system, such as GIS.

Table B6: Biosolids Minimum Monitoring Frequency

Quantity of biosolids land applied or produced for sale or distribution per calendar year		Minimum Sampling Frequency
(dry metric tons)	(dry U.S. tons)	
Less than 290	Less than 320	Once per year
290 to 1,500	320 to 1,653	Once per quarter (4x/year)
1500 to 15,000	1,653 to 16,535	Once per 60 days (6x/year)
15,000 or more	16,535 or more	Once per month (12x/year)

6. Groundwater Monitoring Requirements

The permittee must monitor groundwater as listed below. The samples must be representative of the groundwater flowing through the aquifer at the time of sample collection. The samples will be collected at the monitoring well(s) as identified in the Groundwater Monitoring Plan.

Table B7: Groundwater Monitoring

Item or Parameter	Minimum Frequency	Sample Type/ Required Action	Report
Dissolved Oxygen	Quarterly	Measurement	Annual Report
Oxidation Reduction Potential	Quarterly	Measurement	Annual Report
pH	Quarterly	Measurement	Annual Report
Turbidity	Quarterly	Measurement	Annual Report
Temperature	Quarterly	Measurement	Annual Report
Total Suspended Solids	Quarterly	Grab	Annual Report
BOD_5	Quarterly	Grab	Annual Report
Total Dissolved Solids	Quarterly	Grab	Annual Report
Total Nitrogen	Quarterly	Grab	Annual Report
E. coli	Quarterly	Grab	Annual Report
Total Phosphorus	Quarterly	Grab	Annual Report

7. Surface Water Monitoring Requirements

The permittee must monitor surface water of the John Day River as listed below. The samples must be representative of the water flowing in the John Day River at the designated locations. Samples will be collected from the upstream site and downstream site for each sampling event. These samples will be collected at the locations identified in the Surface Water Monitoring Plan. The permittee may request a reduction or termination of this sampling effort after collection of three full years of data if the data clearly shows no evidence of discharge of pollutants from the facility to surface water.

Table B8: Surface Water Monitoring

Item or Parameter	Minimum Frequency	Sample Type/ Required Action	Report
Total Flow (MGD)	Quarterly	Measurement	Annual Report
Dissolved Oxygen	Quarterly	Measurement	Annual Report
pH	Quarterly	Measurement	Annual Report
Temperature	Quarterly	Measurement	Annual Report
E. coli	Quarterly	Grab	Annual Report
Total Nitrogen	Quarterly	Grab	Annual Report
BOD_5	Quarterly	Grab	Annual Report

SCHEDULE C: COMPLIANCE SCHEDULE

This permit has no compliance schedule.

SCHEDULE D: SPECIAL CONDITIONS

1. Inflow and Infiltration

The permittee must submit to DEQ an annual inflow and infiltration report on a DEQ approved form as directed in Table B1. The report must include the following:

a. An assessment of the facility's I/I issues based on a comparison of summer and winter flows to the plant.

b. Details of activities performed in the previous year to identify and reduce inflow and infiltration.

c. Details of activities planned for the following year to identify and reduce inflow and infiltration.

d. A summary of sanitary sewer overflows that occurred during the previous year. This should include the following: date of the SSO, location, estimated volume, cause, follow-up actions and if performed, the results of receiving stream monitoring.

2. Emergency Response and Public Notification Plan

The permittee must develop an Emergency Response and Public Notification Plan ("plan"), or ensure the facility's existing plan is current and accurate, per Schedule F, Section B, and Condition 8 within 6 months of permit effective date. The permittee must update the plan annually to ensure all information contained in the plan, including telephone and email contact information for applicable public agencies, is current and accurate. An updated copy of the plan must be kept on file at the facility for DEQ review. The latest plan revision date must be listed on the plan cover along with the reviewer's initials or signature.

3. Recycled Water Use Plan

In order to distribute recycled water, the permittee must develop and maintain a DEQ-approved Recycled Water Use Plan meeting the requirements in OAR 340-055-0025. The permittee must submit this plan or any significant modifications to DEQ for review and approval with sufficient time to clear DEQ review and a public notice period prior to distribution of recycled water. The permittee is prohibited from distributing recycled water prior to receipt of written approval of its Recycled Water Use Plan from DEQ. The permittee must keep the plan updated. All plan revisions require written authorization from DEQ and are effective upon permittee's receipt of DEQ written approval. No significant modifications can be made to a plan for an administratively extended permit (after the permit expiration date). Conditions in the plan are enforceable requirements under this permit. DEQ will provide an opportunity for public review and comment on any significant plan modifications prior to approving or denying. Public review is not required for minor modifications, changes to utilization dates or changes in use within the recycled water class.

4. Exempt Wastewater Reuse at the Treatment System

Recycled water used for landscape irrigation within the property boundary or in-plant processes at the wastewater treatment system is exempt from the requirements of OAR 340-055 if all of the following conditions are met:

a. The recycled water is an oxidized and disinfected wastewater.

b. The recycled water is used at the wastewater treatment system site where it is generated or at an auxiliary wastewater or sludge treatment facility that is subject to the same NPDES or WPCF permit as the wastewater treatment system.

c. Spray and/or drift from the use does not migrate off the site.

d. Public access to the site is restricted.

5. Wastewater Solids Annual Report

Until the permittee has an approved biosolids program, the permittee must submit a Wastewater Solids Annual Report each year documenting removal of wastewater solids from the facility during the previous calendar year. The permittee must use the DEQ approved wastewater solids annual report form. This report must include the volume of material removed and the name of the permitted facility that received the solids.

6. Biosolids Management Plan

Prior to distributing biosolids to the public, the permittee must develop and maintain a Biosolids Management Plan and Land Application Plan meeting the requirements in OAR 340-050-0031. The permittee must submit these plans and any significant modification of these plans to DEQ for review and approval with sufficient time to clear DEQ review and a public notice period prior to removing biosolids from the facility. The permittee must keep the plans updated. All plan revisions require written authorization from DEQ and are effective upon permittee's receipt of DEQ written approval. No significant modifications can be made to a plan for an administratively extended permit (after the permit expiration date). Conditions in the plans are enforceable requirements under this permit.

a. Site Authorization

The permittee must obtain written authorization from DEQ for each land application site prior to its use. Conditions in site authorizations are enforceable requirements under this permit. The permittee is prohibited from land applying biosolids to a DEQ-approved site except in accordance with the site authorization, while this permit is effective and with the written approval of the property owner. DEQ may modify or revoke a site authorization following the procedures for a permit modification described in OAR 340-045-0055.

b. Public Participation

i. DEQ will provide an opportunity for public review and comment on any significant plan modifications prior to approving or denying. Public review is not required for minor modifications or changes to utilization dates.

ii. No DEQ-initiated public notice is required for continued use of sites identified in the DEQ-approved biosolids management plan.

iii. For new sites that fail to meet the site selection criteria in the biosolids management plan or that are deemed by DEQ to be sensitive with respect to residential housing, runoff potential, or threat to groundwater, DEQ will provide an opportunity for public comment as directed by OAR 340-050-0015(10).

iv. For all other new sites, the permittee must provide for public participation following procedures in its DEQ-approved land application plan.

7. Wastewater Solids Transfers

a. *Within state.* The permittee may transfer wastewater solids including Class A and Class B biosolids, to another facility permitted to process or dispose of wastewater solids, including but not limited to: another wastewater treatment facility, landfill, or incinerator. The permittee must satisfy the requirements of the receiving facility. The permittee must report the name of the receiving facility and the quantity of material transferred in the wastewater solids annual report identified in Schedule B.

b. *Out of state.* If wastewater solids, including Class A and Class B biosolids, are transferred out of state for use or disposal, the permittee must obtain written authorization from DEQ, meet Oregon requirements for the use or disposal of wastewater solids, notify in writing the receiving

state of the proposed use or disposal of wastewater solids, and satisfy the requirements of the receiving state.

8. Hauled Waste Control Plan

The permittee may accept hauled wastes at discharge points designated by the POTW after receiving written DEQ approval of a Hauled Waste Control Plan. Hauled wastes may include wastewater solids from another wastewater treatment facility, septage, grease trap wastes, portable and chemical toilet wastes, landfill leachate, groundwater remediation wastewaters and commercial/industrial wastewaters.

9. Hauled Waste Annual Report

Once the permittee has an approved hauled waste program, the permittee must submit a Hauled Waste Annual Report each year documenting volume of hauled waste received at the facility during the previous calendar year. The permittee must use the DEQ approved hauled waste annual report form.

10. Groundwater Monitoring Plan

The permittee must develop a Groundwater Monitoring Plan within **12 months** of permit effective date. This plan must detail the groundwater monitoring well construction, location and sampling activities and techniques such as but not limited to: purge volumes, field parameter collection and stabilization, sample handling and management, laboratory selection, analytical methods, target detection levels, field instrument calibration, and sampling quality assurance and quality control measures. This plan must be submitted to DEQ for approval. A copy of the approved plan must be kept on file at the facility for DEQ review. The latest plan revision date must be listed on the plan cover.

11. Surface Water Monitoring Plan

The permittee must develop a Surface Water Monitoring Plan within **12 months** of permit effective date. This plan must detail the surface water monitoring locations and sampling activities and techniques such as but not limited to: methods used for sample collection, equipment decontamination, field parameter collection, field instrument calibration, sample handling and management, laboratory selection, analytical methods, target detection levels, and sampling quality assurance and quality control measures. This plan must be submitted to DEQ for approval. A copy of the plan must be kept on file at the facility for DEQ review. The latest plan revision date must be listed on the plan cover.

12. Operator Certification

a. Definitions

i. “Supervise” means to have full and active responsibility for the daily on site technical operation of a wastewater treatment system or wastewater collection system.

ii. “Supervisor” or “designated operator”, means the operator delegated authority by the permittee for establishing and executing the specific practice and procedures for operating the wastewater treatment system or wastewater collection system in accordance with the policies of the owner of the system and any permit requirements.

iii. “Shift Supervisor” means the operator delegated authority by the permittee for executing the specific practice and procedures for operating the wastewater treatment system or wastewater collection system when the system is operated on more than one daily shift.

iv. “System” includes both the collection system and the treatment systems.

b. The permittee must comply with OAR Chapter 340, Division 49, “Regulations Pertaining to Certification of Wastewater System Operator Personnel" and designate a supervisor whose certification corresponds with the classification of the collection and/or treatment system as specified in the DEQ Supervisory Wastewater Operator Status Report. DEQ may revise the permittee’s classification in writing at any time to reflect changes in the collection or treatment system. This reclassification is not considered a permit modification and may be made after the

permit expiration date provided the permit has been administratively extended by DEQ. If a facility is re-classified, a certified letter will be mailed to the system owner from the DEQ Operator Certification Program. Current system classifications are publicized on the DEQ Supervisory Wastewater Operator Status Report found on the DEQ Wastewater Operator Certification Homepage.

c. The permittee must have its system supervised full-time by one or more operators who hold a valid certificate for the type of wastewater treatment or wastewater collection system, and at a grade equal to or greater than the wastewater system's classification.

d. The permittee's wastewater system may be without the designated supervisor for up to 30 consecutive days if another person who is certified at no more than one grade lower than the classification of the wastewater system supervises. The permittee must delegate authority to this operator to supervise the operation of the system.

e. If the wastewater system has more than one daily shift, the permittee must have another properly certified operator available to supervise operation of the system. Each shift supervisor must be certified at no more than one grade lower than the system classification.

f. The permittee is not required to have a supervisor on site at all times; however, the supervisor must be available to the permittee and operator at all times.

g. The permittee must notify DEQ in writing of the name of the system supervisor by completing and submitting the Supervisory Wastewater System Operator Designation Form along with the Delegated Authority form?). The most recent version of this form may be found on the DEQ Wastewater Operator Certification homepage *NOTE: This form is different from the Delegated Authority form. The permittee may replace or re-designate the system supervisor with another properly certified operator at any time and must notify DEQ in writing within 30 days of replacement or re-designation of the operator in charge. As of this writing, the notice of replacement or re-designation must be sent to Water Quality Division, Operator Certification Program, 700 NE Multnomah St, Suite 600, Portland, OR 97232-4100. This address may be updated in writing by DEQ during the term of this permit.

h. When compliance with item (e) of this section is not possible or practicable because the system supervisor is not available or the position is vacated unexpectedly, and another certified operator is not qualified to assume supervisory responsibility, the Director may grant a time extension for compliance with the requirements in response to a written request from the system owner. The Director will not grant an extension longer than 120 days unless the system owner documents the existence of extraordinary circumstances.

13. Industrial User Survey

Industrial User Survey

a. By the date listed in Table B1, the permittee must conduct an industrial user survey as described in 40CFR 403.8(f)(2)(i-iii) to determine the presence of any industrial users discharging wastewaters subject to pretreatment and submit a report on the findings to DEQ. The purpose of the survey is to identify whether there are any industrial users discharging to the POTW, and ensure regulatory oversight of these discharges to state waters.

Should the DEQ determine that a pretreatment program is required, the permit must be reopened and modified in accordance with 40 CFR 403.8(e)(1) to incorporate a compliance schedule for development of a pretreatment program. The compliance schedule must be developed in accordance with the provisions of 40 CFR 403.12(k), and must not exceed twelve (12) months.

14. Reopener Clause

This permit may be re-opened and modified to include new or revised discharge limitations, monitoring, or reporting requirements, compliance conditions and schedules, and special conditions. If necessary, DEQ will commence modification of this permit by notifying the permittee and seeking public comment on the proposed modifications.

The permittee is responsible for requesting modification of this permit to incorporate any proposed system alterations that require a change in the compliance conditions of this permit.

SCHEDULE E: PRETREATMENT ACTIVITIES

This permit does not include a pretreatment program.

SCHEDULE F: WPCF GENERAL CONDITIONS - Domestic

SECTION A. STANDARD CONDITIONS

1. Duty to Comply with Permit
   The permittee must comply with all conditions of this permit. Failure to comply with any permit condition is a violation of Oregon Revised Statutes (ORS) 468B.025 and grounds for an enforcement action. Failure to comply is also grounds for DEQ to modify, revoke, or deny renewal of a permit.

2. Property Rights and Other Legal Requirements
   Issuance of this permit does not convey any property rights of any sort, or any exclusive privilege, or authorize any injury to persons or property or invasion of any other rights, or any infringement of federal, tribal, state, or local laws or regulations.

3. Liability
   DEQ or its officers, agents, representatives, or employees may not sustain any liability on account of the issuance of this permit or on account of the construction or maintenance of facilities or systems because of this permit.

4. Permit Actions
   After notice by DEQ, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including but not limited to the following:
   a. Violation of any term or condition of this permit, any applicable rule or statute, or any order of the Environmental Quality Commission;
   b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.

5. Transfer of Permit
   This permit may not be transferred to a third party without prior written approval from DEQ. DEQ may approve transfers where the transferee acquires a property interest in the permitted activity and agrees in writing to fully comply with all the terms and conditions of this permit and the rules of the Environmental Quality Commission. A transfer application and filing fee must be submitted to DEQ.

6. Permit Fees
   The permittee must pay the fees required by Oregon Administrative Rules.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance
   At all times the permittee must maintain in good working order and properly operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to comply with the terms and conditions of this permit.

2. Standard Operation and Maintenance
   All waste collection, control, treatment, and disposal facilities or systems must be operated in a manner consistent with the following:
   a. At all times, all facilities or systems must be operated as efficiently as possible in a manner that will prevent discharges, health hazards, and nuisance conditions.
   b. All screenings, grit, and sludge must be disposed of in a manner approved by DEQ to prevent any pollutant from the materials from reaching waters of the state, creating a public health hazard, or causing a nuisance condition.

c. Bypassing untreated waste is generally prohibited. Bypassing may not occur without prior written permission from DEQ except where unavoidable to prevent loss of life, personal injury, or severe property damage.

3. Noncompliance and Notification Procedures

If the permittee is unable to comply with conditions of this permit because of surfacing sewage; a breakdown of equipment, facilities or systems; an accident caused by human error or negligence; or any other cause such as an act of nature, the permittee must:

a. Immediately take action to stop, contain, and clean up the unauthorized discharges and correct the problem.
b. Immediately notify the appropriate DEQ regional office so that an investigation can be made to evaluate the impact and the corrective actions taken, and to determine any additional action that must be taken.
c. Within 5 days of the time the permittee becomes aware of the circumstances, the permittee must submit to DEQ a detailed written report describing the breakdown, the actual quantity and quality of waste discharged, corrective action taken, steps taken to prevent a recurrence, and any other pertinent information.

Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this permit or liability for failure to comply.

4. Wastewater System Personnel

The permittee must provide an adequate operating staff that is duly qualified to carry out the operation, maintenance, and monitoring requirements to assure continuous compliance with the conditions of this permit.

5. Public Notification of Effluent Violation or Overflow

If effluent limitations specified in this permit are exceeded or an overflow occurs that threatens public health, the permittee must take such steps as are necessary to alert the public, health agencies and other affected entitles (e.g., public water systems) about the extent and nature of the discharge in accordance with the notification procedures developed in accordance with General Condition B.6. Such steps may include, but are not limited to, posting of the river at access points and other places, news releases, and paid announcements on radio and television.

6. Emergency Response and Public Notification Plan

The permittee must develop and implement an emergency response and public notification plan that identifies measures to protect public health from bypasses or upsets that may endanger public health. At a minimum the plan must include mechanisms to:

a. Ensure that the permittee is aware (to the greatest extent possible) of such events;
b. Ensure notification of appropriate personnel and ensure that they are immediately dispatched for investigation and response;
c. Ensure immediate notification to the public, health agencies, and other affected entities (including public water systems). The response plan must identify the public health and other officials who will receive immediate notification;
d. Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained;
e. Provide emergency operations: and
f. Ensure that DEQ is notified of the public notification steps taken.

SECTION C. MONITORING AND RECORDS

1. Inspection and Entry
   The permittee must at all reasonable times allow authorized representatives of DEQ to:
   a. Enter upon the permittee's premises where a waste source or disposal system is located or where any records are required to be kept under the terms and conditions of this permit;
   b. Have access to and copy any records required by this permit;
   c. Inspect any treatment or disposal system, practices, operations, monitoring equipment, or monitoring method regulated or required by this permit; or
   d. Sample or monitor any substances or permit parameters at any location at reasonable times for the purpose of assuring permit compliance or as otherwise authorized by state law.

2. Averaging of Measurements
   Calculations of averages of measurements required for all parameters except bacteria must use an arithmetic mean; bacteria must be averaged as specified in the permit.

3. Monitoring Procedures
   Monitoring must be conducted according to test procedures specified in the most recent edition of **Standard Methods for the Examination of Water and Wastewater**, unless other test procedures have been approved in writing by DEQ and specified in this permit.

4. Retention of Records
   The permittee must retain records of all monitoring and maintenance information, including all calibrations, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. DEQ may extend this period at any time.

SECTION D. REPORTING REQUIREMENTS

1. Plan Submittal
   Pursuant to Oregon Revised Statute 468B.055, unless specifically exempted by rule, construction, installation, or modification of disposal systems, treatment works, or sewerage systems may not commence until plans and specifications are submitted to and approved in writing by DEQ. All construction, installation, or modification shall be in strict conformance with the DEQ's written approval of the plans.

2. Change in Discharge
   Whenever a facility expansion, production increase, or process modification is expected to result in a change in the character of pollutants to be discharged or in a new or increased discharge that will exceed the conditions of this permit, a new application must be submitted together with the necessary reports, plans, and specifications for the proposed changes. A change may not be made until plans have been approved and a new permit or permit modification has been issued.

3. Signatory Requirements
   All applications, reports, or information submitted to DEQ must be signed and certified by the official applicant of record (owner) or authorized designee.

4. Twenty-Four Hour Reporting
   The permittee must report any noncompliance that may endanger health or the environment. Any information must be provided orally (by telephone) within 24 hours from the time the permittee becomes aware of the circumstances, unless a shorter time is specified in the permit. During normal business hours, DEQ's regional office must be called. Outside of normal business hours, DEQ must be contacted at 1-800-452-0311 (Oregon Emergency Response System).

The following must be included as information that must be reported within 24 hours under this paragraph:

a. Any unanticipated bypass that exceeds any effluent limitation in this permit;
b. Any upset that exceeds any effluent limitation in this permit;
c. Violation of maximum daily discharge limitation for any of the pollutants listed by DEQ in this permit; and
d. Any noncompliance that may endanger human health or the environment.

A written submission must also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission must contain:

a. A description of noncompliance and its cause;
b. The period of noncompliance, including exact dates and times;
c. The estimated time noncompliance is expected to continue if it has not been corrected;
d. Steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and
e. Public notification steps taken, pursuant to General Condition B.6.

DEQ may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

SECTION E. DEFINITIONS

1. *BOD or BOD_5* means five-day biochemical oxygen demand.
2. *CBOD or $CBOD_5$* means five-day carbonaceous biochemical oxygen demand.
3. *TSS* means total suspended solids.
4. *Bacteria* means but is not limited to fecal coliform bacteria, total coliform bacteria, *Escherichia coli* (*E. coli*) bacteria, and *Enterococcus* bacteria.
5. *FC* means fecal coliform bacteria.
6. *Total residual chlorine* means combined chlorine forms plus free residual chlorine
7. *Technology based permit effluent limitations* means technology-based treatment requirements as defined in 40 CFR § 125.3, and concentration and mass load effluent limitations that are based on minimum design criteria specified in OAR 340-041.
8. *mg/l* means milligrams per liter.
9. *µg/l* means microgram per liter.
10. *kg* means kilograms.
11. *m^3/d* means cubic meters per day.
12. *MGD* means million gallons per day.
13. *Average monthly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.
14. *Average weekly effluent limitation* as defined at 40 CFR § 122.2 means the highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.
15. *Daily discharge* as defined at 40 CFR § 122.2 means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge must be calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge must be calculated as the average measurement of the pollutant over the day.
16. *24-hour composite sample* means a combination of at least six discrete sample aliquots of at least 100 milliliters, collected at periodic intervals from the same location, during the operating hours of the facility over a 24 hour period. Four (rather than six) aliquots should be collected for volatile organics analyses. The composite must be flow or time proportional, whichever is more appropriate. The sample aliquots must be collected and stored in accordance with procedures prescribed in the most recent edition of *Standard Methods for the Examination of Water and Wastewater*.
17. *Grab sample* means an individual discrete sample collected over a period of time not to exceed 15 minutes.
18. *Quarter* means January through March, April through June, July through September, or October through December.
19. *Month* means calendar month.
20. *Week* means a calendar week of Sunday through Saturday.
21. Commission or Environmental Quality Commission means the governor appointed panel which serves as the Oregon Department of Environmental Quality's policy and rulemaking board.
22. Department means the Oregon Department of Environmental Quality.

Signature: Shannon Davis
Shannon Davis (Apr 18, 2022 16:53 PDT)

Email: shannon.davis@deq.oregon.gov

103281-PERM-JOHNDAYWWTF20220418

Final Audit Report 2022-04-18

Created:	2022-04-18
By:	Patty Isaak (patty.isaak@deq.oregon.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAA0cJKu8pEMz9utZ1Ds_1MTkfPsRUI-cgy

"103281-PERM-JOHNDAYWWTF20220418" History

Document created by Patty Isaak (patty.isaak@deq.oregon.gov)
2022-04-18 - 6:27:07 PM GMT

Document emailed to Shannon Davis (shannon.davis@deq.oregon.gov) for signature
2022-04-18 - 6:27:34 PM GMT

Email viewed by Shannon Davis (shannon.davis@deq.oregon.gov)
2022-04-18 - 7:54:58 PM GMT

Document e-signed by Shannon Davis (shannon.davis@deq.oregon.gov)
Signature Date: 2022-04-18 - 11:53:28 PM GMT - Time Source: server

Agreement completed.
2022-04-18 - 11:53:28 PM GMT

APPENDIX B
EXAMPLE FIELD REPORT FORMS

Daily Activity Log

Page _1_ of

Client: ____

Project: ____

Site: ____

Project Number: ____

Field Personnel: ____

Date: ____

Date	Time	Description of Activity

SURFACE WATER SAMPLING LOG

Project:_____

Site ID:_____

Field Personnel:_____

Date and Time:_____

General Information	
	Notes:
Stream Conditions:	
Weather Conditions:	
Access Site Conditions:	

Field Instrument Calibration			
Parameter	Standard Value	Units	Calibration Value
pH		-	
DO		mg/L	
Conductivity		mS/cm	

Field Measurements of Sample	
Parameter	Value and Unit
pH	
Temperature	
DO	
Conductivity	

Sample Information		
Sample ID		Date and Time
Primary		
Duplicate		
Blank		
Other		

Number of Bottles:_____

Volume of Bottles:_____

Notes:

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST

Page _____ of _____ COC # _____

Client: _____
Project: _____
Site: _____
Project Number: _____
Sampled By: _____
Receiving Lab: _____
P.O.#: _____

Requested Analytical Method

Turnaround Time

____ Standard
_____ 24 hr. _____48 hr. _____ 3-5 day
_____ 7 day _____14 day _____ day

EDD Data Required?
Yes_____ No_____
Send To: _____

Sample ID	Date	Time	Matrix	Lab ID	No. Containers															Comments

Relinquished by:
Name: Firm:
Signature:
Date: Time:

Received by:
Name: Company:
Signature:
Date: Time:

Shipping Details
Method of shipment:

Airbill #:

Relinquished by:
Name: Firm:
Signature:
Date: Time:

Received by:
Name: Company:
Signature:
Date: Time:

Additional Remarks/Comments:
Report to:

APPENDIX C

FIELD SAMPLING AND MONITORING EQUIPMENT LIST

City of John Day
Water Pollution Control Facility (WPCF) Permit
Surface Water Monitoring Plan

Surface Water Monitoring and Sampling Field Equipment List

Proposed Equipment for Measurement of Field Parameters:

Proposed Equipment	Required Parameter	Accuracy*
Sper Scientific Water Quality Meter *or similar*	Temperature	± 0.8 °C
	pH	± 0.02
	Oxidation-Reduction Potential (ORP)	± 0.5%
	Dissolved Oxygen (DO)	± 0.4 ppm
Durham Geo-Slope Water Level Meter *or similar*	Water Depth	± 0.01 ft

**Based on manufacturer specifications.*

Proposed Equipment for Monitoring Well Purging and Sampling:

- ☐ Powder-free nitrile gloves
- ☐ Clean 5-gallon buckets (2)
- ☐ Distilled/purified water (2 gallons per sampling event)
- ☐ Alconox detergent
- ☐ Scrub brush and spray bottle
- ☐ Paper towels
- ☐ Plastic sheeting and garbage bags
- ☐ Sharpie markers for labeling
- ☐ Field log sheets and notebook

- ☐ Lab-provided sample bottles
- ☐ Cooler for sample transport
- ☐ Ice for coolers

CITY OF JOHN DAY – CONSERVATION MEASURE MONITORING PLAN

Evaluation Surface & Groundwater Samples for the U.S. Fish and Wildlife Service and National Marine Fisheries Service

Project No. 2111005
September 20, 2023

PREPARED FOR:

City of John Day
450 East Main Street
John Day, OR 97845

CwM-H2O
Complete Water Management

Contents

Tables

Figures

Attachments

Introduction

This document presents the City of John Day's (City) proposed Conservation Measure Monitoring Plan (Plan) for Effluent, Surface Water, and Groundwater. This Plan proposes to provide mitigation requirements based on the findings of the City of John Day Wastewater System Improvement Project Biological Assessment (BA) prepared by Mason Bruce and Girard (MBG, 2023). The specific monitoring parameters, locations, and methods are based on guidance provided by US Fish and Wildlife and National Marine Fishery Service (Services).

The City currently infiltrates treated wastewater into the John Day River Valley alluvial aquifer through a system of percolation ponds. The Water Pollution Control Facility (WPCF) system included in the City's new Permit proposes a higher level of initial treatment at a new wastewater treatment facility and infiltration through a subsurface infiltration gallery (SIG) located west of the existing ponds (Figure 1). The primary change from current infiltration conditions is the shift of the point of infiltration to the west and towards the center of the local alluvial aquifer.

In support of the permitting process, the City completed a hydrogeologic investigation and modeling study to understand the movement of groundwater through the alluvial aquifer that will continue to receive treated effluent via infiltration. The study identified the approximate flow path from the proposed SIG through the aquifer and predicted that the infiltrated water will eventually discharge back to a downstream reach of the John Day River. The City has formulated this additional Conservation Measure Monitoring Plan (Plan) to address concerns relayed by the Services specific to heavy metals and petroleum components in treated effluent infiltrated to the alluvial aquifer and the potential adverse impact these metals and petroleum products might have on surface water conditions in the John Day River and subsequently on the sensitive fish species that potentially inhabit or pass through this stretch of the John Day River.

The sections of this Plan are as follows:

- Section 1 – Purpose and Goals
- Section 2 – Monitoring Program Sites & Schedule
- Section 3 – Sample Collection and Analysis Program
- Section 4 – Data Analysis and Reporting Procedures

1 Purpose

The purpose of this Plan is to present a water quality monitoring protocol to assess the concentrations of metals and petroleum products at the current concentrations in treated City effluent, groundwater, and potentially effected surface water of the John Day River as background conditions, then monitor the same locations post construction of the new WWTP to assess potential changes in water quality conditions. The proposed monitoring activities are separate from and in addition to those activities proposed as part of the City's required WPCF monitoring plans (CwM, 2023), though some monitoring locations and monitoring schedules will be shared between the two programs.

The goals of the proposed additional water quality monitoring program are as follows:

- Establish baseline target metals and petroleum component concentrations for the City's current treated effluent which is currently discharged to the percolation ponds.

- Establish current groundwater background target metals and petroleum component concentrations in the alluvial aquifer along the John Day River Valley using a monitoring well network required by the WPCF Permit.
- Establish current low-flow surface water background concentrations of target metals and petroleum products in the John Day River at sampling locations upstream and downstream of the proposed SIG.
- Post-construction monitoring of effluent, groundwater, and surface water quality. Data will be compared to established background levels to assess the impacts of SIG operation on water quality in groundwater and in the John Day River.
- Utilize the Biological Ligand Model (BLM) to determine how site-specific surface water quality characteristics impact the fish toxicity criteria for target metals measured in the John Day River.

The monitoring criteria and schedules are presented in Section 2 Monitoring and Program Schedule.

1.1 Affected Aquifer and River Systems

The proposed SIG system will introduce treated wastewater effluent to the uppermost aquifer system, the shallow alluvial aquifer of the John Day River Valley, at a location just west of the City's current percolation ponds (Figure 1). The alluvial aquifer is the only impacted aquifer system identified in the CwM-H2O, LLC (CwM) hydrogeologic investigation report (CwM, 2021). The alluvial aquifer ranges from just a few feet thick along the John Day valley walls to up to 50-ft thick in some areas at the center of the valley. Native alluvial deposits in the John Day Valley consist of relatively compacted silts and sands interspersed with gravels and cobbles. Large-scale dredging in the late 19th and early 20th centuries transformed the alluvial aquifer around the City by washing away most of the fine sediment and redepositing the rest. Dredged areas now consist primarily of sandy gravel and cobbles. Patches of silty sand are found where dredge ponds were constructed or where finer sediments settled out of the tailings.

The permitted SIG facility is located in an oblong section of the alluvial aquifer, bounded on the north by bedrock of the valley wall and to the south by the John Day River. The river's channel flows up against the valley wall to the west and east of the WWTP, pinching out the alluvial aquifer and creating a flow-through groundwater system (Figure 1). The up-gradient end of the alluvial aquifer (eastern end) is marked by the confluence of Davis Creek (flows from north to south) and Canyon Creek (from the south to north).

The John Day River acts as a hydrologic divide in the shallow alluvial aquifer. Because of the hydraulic influence of the river on local groundwater flow, only the alluvial aquifer north of the river will be impacted by the activities performed under the WPCF Permit. The John Day River recharges the alluvial aquifer in its losing reach upstream (east) of the proposed WWTP. Groundwater flows through the alluvial aquifer from east to west. The groundwater gradient in the aquifer approximates the gradient of the river and the gradual slope of the valley to the west. Groundwater discharges from the aquifer back to the John Day River channel towards the western terminus of the alluvial deposits north of the river (CwM, 2021).

Treated wastewater that is infiltrated into the alluvial aquifer will percolate downward to the saturated zone before flowing down-gradient to the west (Figure 1). Groundwater modeling of the SIG system indicated that the infiltrated water will potentially discharge to the river over a diffuse portion of riverbank up to approximately 2,800 ft (850 m) wide (Figure 1) located approximately 3,300 ft (1 km) downstream of the SIG under average river conditions (CwM, 2021). Modeling suggests that when river levels are very low, infiltrated water may discharge to the river over a more up-stream reach. Conversely, when river levels are very high,

such as in the spring snowmelt season, infiltrated water is pushed further downgradient before discharging to the river. The core flow path from the SIG to the River reaches the riverbank over approximately a 500-ft (150-m) wide primary discharge zone (Figure 1). The monitoring sites proposed in this Plan will monitor the aquifer near the SIG, along the flow path, and above and below the expected discharge area to the River.

Access to the private lands along the John Day River downstream of the proposed SIG site is uncertain. The City will identify all private land ownership and request access to the monitoring locations proposed in this Plan. This is discussed further in Section 2.3.

1.2 Sampling Access and Logistics

Access to areas potentially impacted by dispersed groundwater and effluent entering the John Day River are difficult to reach due to the need for private access agreements with landowners.

CwM assessed the potential for sampling from two bridge crossings of the John Day River near the estimated area of impact along the north shore of the river. Both bridges are known as Patterson Bridge Road. Relative to one another, the downstream bridge (west) is a private access bridge to an industrial site. The upstream bridge (east) has a public road crossing but is not sufficiently downstream from the SIG to capture the anticipated discharge area to the river.

Sampling by boat or other floatation device may be physically impractical in this section of the John Day River in both low- and high-flow periods and private ownership. The main stem of the John Day River above Kimberley, Oregon (River Mile 184) is non-navigable, and the riverbed is privately owned land above this point. At the City of John Day (River Mile 27), access by boat might legally require landowner permission. Due to the increased difficulties and logistics associated access to private land and with sampling by boat compared to sampling from the bank, the City's preference is for riverbank access for sample collection.

If the City can obtain permission from landowners, the City will collect a composite sample from the John Day River at three locations within or downstream of the potential area of discharge of treated effluent (option SW-2A). In this case, samples will be collected at dispersed locations by wading into the river at least 3 ft from the shoreline and/or in at least 2 ft of water. Grab samples will be collected in a manner that integrates water from various depths within the river. A sample splitter or similar method will be used to homogenize the various grab samples into one representative sample of sufficient volume for all analyses. If this composite method is used, the same three sampling sites will be used for each sampling event. GPS coordinates will be collected at the sampling entry point at the riverbank for later reference.

The City will submit written sampling access requests to private land owners along the downstream reach of the John Day River (see Section 2.4, Attachment 1). If access is not permitted in a sufficient number of locations to perform the composite sampling procedure described above, then a single depth integrated sample will be collected at the Grant County Roads Department facility along the south side of the river (option SW-2B). The City has obtained provisional approval from the Grant County Roads Department to access the southern bank of the John Day River at this facility. This location is about 1.75 miles downstream from the City's proposed infiltration point and about 0.75 miles downstream from the potential discharge reach of the river.

2 Monitoring Program & Schedule

The proposed monitoring program for heavy metals and petroleum components is separated into pre-construction and operational phases. The two monitoring periods, described in this section are as follows:

- Preconstruction Phase – Background Monitoring (pre-SIG operations). Start in Year 1 of the monitoring plan approximately one year prior to the new plant operations.
- Operational Phase – Monitoring of SIG Operations. Start post construction of new wastewater facility. Quarterly for two years.

2.1 Preconstruction Phase – Background Monitoring (Pre-SIG Operations)

The purpose of preconstruction monitoring is to document current background water quality conditions in:

- Current treated wastewater effluent (Effluent)
- The alluvial aquifer near the SIG facility proposed in the City's WPCF permit (Groundwater)
- The John Day River (Surface Water).

Operations at the existing wastewater treatment plant and use of the percolation ponds will continue until the proposed new plant and SIG facilities are built and commissioned. The background monitoring proposed by this plan is scheduled to start in 2024 (Year 1) and will continue quarterly until the SIG facility comes on line, or for a period of 1-year, whichever is shorter, unless formal modification of this plan is required. Preconstruction sampling will document annual and seasonal variability for various water quality parameters including metals and petroleum products of concern.

2.1.1 Sampling Locations

Preconstruction Phase sampling will occur at the following locations (Figure 2):

- Alluvial monitoring well upgradient of the proposed SIG (CJD-1, new).
- Alluvial monitoring well immediately downgradient of the proposed SIG (CJD-2, new).
- Alluvial monitoring wells further down the groundwater flow path from the proposed SIG facility (CJD-3, CJD-4, and CJD-5, all new).
- A location on the John Day River upstream of the current percolation ponds (SW-1).
- A location(s) on the John Day River downstream (SW-2A or SW-2B) of the potential area of discharge of treated effluent from the current percolation ponds and from the proposed SIG facility.
- The effluent from the current wastewater treatment plant before discharge (Ponds).

The City will construct the proposed new monitoring wells (CJD-1 through CJD-5). Preconstruction Phase sampling and monitoring will not begin until the complete groundwater monitoring well network is complete.

Sampling of the selected groundwater monitoring wells within the alluvial aquifer include locations dominated by recharge from the John Day River (CJD-1), areas which will be heavily influenced by the proposed wastewater infiltration (CJD-2), and areas of the aquifer that will experience more limited effects from future infiltration of treated wastewater (CJD-3, CJD-4, and CJD-5). The samples collected from the three downgradient wells (CJD-3, CJD-4, and CJD-5) will be split into single representative composite samples for each area to limit the overall number of samples for analysis (Figure 2).

Upstream and downstream sampling in the river will determine what quality changes already occur in that reach of the river and if metals are currently present in surface water before entering the City wastewater system's area of influence (Figure 2). Background sampling at these locations will inform the City of the potential impacts of the current percolation ponds on groundwater and surface water quality and will establish a range of values to compare future water quality to under the operation of the SIG (Operational Phase).

The City will also sample effluent from the existing treatment plant in the Preconstruction Phase to determine the extent to which the targeted metals and petroleum components are potentially present in the City's municipal wastewater. It is important to characterize the current effluent in order to understand current conditions and potential future changes to groundwater and surface water quality. Effluent samples will be tested for targeted metals and TPH analytes proposed for surface water monitoring.

2.1.2 Sampling Parameters

Preconstruction Phase background sample analysis will include the suite of targeted metals and petroleum components specified by the Services, as well as other water quality parameters necessary for toxicity calculations or measured in the field (Table 1).

Table 1 – Preconstruction Phase Sampling Parameters

Location	Metals	Petroleum Components	Other Parameters
Groundwater CJD-1, CJD-2, CJD-3, CJD-4, CJD-5	As, Cu, Cr	Polycyclic Aromatic Hydrocarbons (PAH)[1]	Temp., Conductivity, pH
John Day River (SW-1 and SW-2A or SW-2B)	Al, Cu, Cd, Ni, Zn	Total Petroleum Hydrocarbons (TPH)[2]	Temp., Conductivity, pH, nitrate, dissolved organic carbon (DOC), other major cations and anions[3], hardness, alkalinity.
WWTP Effluent			Temp., Conductivity, pH

1. *Indicators of the presence of wood-treating chemicals.*
2. *Gasoline and diesel range organics.*
3. *Ca, Mg, Na, K, SO_4, Cl.*

2.1.3 Sampling Schedule

Preconstruction background sampling is scheduled to begin in 2024. Sampling will then progress on a quarterly basis until the proposed new treatment plant and SIG facility are on-line or four quarterly sample events are completed. This schedule is expected to allow for four concurrent quarterly sampling events. However, more than one calendar year may pass between the start of monitoring and the start of operations at the new facility. The conceptual three year schedule for both Preconstruction and Postconstruction is Presented in Table 3. This schedule is subject to change based on the results of the monitoring and schedule of construction.

Quarterly sampling events will generally occur in the following months:

- Second week of March – Effluent and Groundwater only

- Second week of June – Effluent, Groundwater and Surface Water (early dry season sampling)
- Second week of September – Effluent, Groundwater and Surface Water (end of dry season sampling)
- Second week of December – Effluent, Groundwater only.

Sampling of surface water at the upstream and downstream locations will be limited to two events per year during low-flow periods. These events will correspond with the June and September quarterly sampling events for groundwater sites (Table 3).

2.2 Operational Phase – Monitoring of SIG Operations

The goal of the Operational Phase monitoring is to understand if and how operations of the proposed SIG facility may change the existing water quality regime in the alluvial aquifer and John Day River system. The effluent from the new WWTP will also be monitored to compare with the previous treatment system results.

2.2.1 Sampling Locations

The sampling locations for the Operational Phase will be the same groundwater and surface water monitoring locations as proposed in the City's WPCF Groundwater and Surface Water Monitoring Plans and in the Preconstruction Phase of the Plan (Figure 2). The same two surface water sampling sites be utilized (Figure 2):

- Alluvial monitoring well upgradient of the proposed SIG (CJD-1, new).
- Alluvial monitoring well immediately downgradient of the proposed SIG (CJD-2, new).
- Alluvial monitoring wells further down the groundwater flow path from the proposed SIG facility (CJD-3, CJD-4, and CJD-5, all new).
- The same location on the John Day River upstream of the current percolation ponds (SW-1).
- The same location(s) on the John Day River from Phases 1 and 2 downstream (SW-2A or SW-2B) of the potential area of discharge of treated effluent from the current percolation ponds and from the proposed SIG facility.
- Effluent from the new wastewater treatment plant before discharge to the SIG for infiltration (SIG).

The City will also sample effluent from the new WWTP facility delivered to the SIG in the Operational Phase to determine the extent to which target metals and petroleum components are potentially present in the City's municipal wastewater (Figure 2). Effluent samples will be tested for the targeted suite of metals and TPH analytes proposed for surface water monitoring. Characterization of the new facility's effluent and how it differs from the current effluent to the percolation ponds is critical to understand potential impacts of groundwater and surface water quality.

2.2.2 Sampling Parameters

Monitoring of SIG operations will include the same suite of field- and lab-measured parameters as the background sampling. This Plan calls for the downgradient groundwater samples (CJD-3, CJD-4, and CJD-5) to be combined and split into a single representative composite sample to limit the overall number of samples for analysis. This will result in a total of three groundwater samples and two surface water samples for each event (Table 2). A sample of treated effluent will be collected at the SIG before infiltration.

Table 2 – Operational Phase Sampling Parameters			
Location	Metals	Petroleum Components	Other Parameters
Groundwater (CJD-1 through CJD-5)	As, Cu, Cr	Polycyclic Aromatic Hydrocarbons (PAH)[1]	Temp., Conductivity, pH
John Day River (SW-1 and SW-2A or 2B)	Al, Cu, Cd, Ni, Zn	Total Petroleum Hydrocarbons (TPH)[2]	Temp., Conductivity, pH, nitrate, dissolved organic carbon (DOC), major cations and anions[3], hardness, alkalinity.
WWTP Effluent to SIG			Temp., Conductivity, pH

1. *Indicators of the presence of wood-treating chemicals.*
2. *Gasoline and diesel range organics.*
3. *Ca, Mg, Na, K, SO_4, Cl.*

2.2.3 Sampling Schedule

Monitoring will occur following a quarterly sampling schedule. Sampling events for this Plan correspond with sampling events required by the City's WPCF Groundwater and Surface Water Monitoring Plans. Quarterly sampling will begin after the proposed SIG facility begins operations.

Quarterly sampling events will generally occur in the following months:

- Second week of March – Effluent and Groundwater only
- Second week of June – Effluent, Groundwater and Surface Water (early dry season sampling)
- Second week of September – Effluent, Groundwater and Surface Water (end of dry season sampling)
- Second week of December – Effluent, Groundwater only.

Sampling of surface water at the upstream and downstream locations will be limited to two events per year during low-flow periods.

Post construction monitoring of metals in the John Day River will continue for **2 years** (4 quarterly sampling events, two per year during the low-flow season) after operations of the City's new WWTP begins, while monitoring of metals in groundwater will continue for only **1 year** (4 quarterly sampling events). Post construction monitoring of petroleum components, both in groundwater and in the John Day River, will continue for **1 year** (4 sampling quarters for groundwater, 2 for surface water) after operations of the City's new WWTP begins. These periods also apply to WWTP effluent sampling. A conceptual sampling schedule is presented in Table 3.

Table 3 - Sampling Schedule

				Year-1 Background				Year 2- Post Construction				Year 3 - Post Construction			
Sample Source	**Sample Location**	**Sample Type**	**Constituents**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Effluent	After Treatment	Surface Water	pH, Cond., Temp.	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
			Metals: Al, Cd, Cu, Ni, Zn	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
			Total Petroleum Hydrocarbons (TPH)	◆	◆	◆	◆	◆	◆	◆	◆				
Upstream Surface Water	Upstream of Lagoons	Surface Water	Standard[1]		◆	◆			◆	◆			◆	◆	
			Metals: Al, Cd, Cu, Ni, Zn		◆	◆			◆	◆			◆	◆	
			Total Petroleum Hydrocarbons (TPH)		◆	◆			◆	◆					
Downstream Surface Water	Downstream of SIG	Surface Water	Standard[1]		◆	◆			◆	◆			◆	◆	
			Metals: Al, Cd, Cu, Ni, Zn		◆	◆			◆	◆			◆	◆	
			Total Petroleum Hydrocarbons (TPH)		◆	◆			◆	◆					
CJD MW-1	Upgradient of SIG	Groundwater	pH, Cond., Temp.	◆	◆	◆	◆	◆	◆	◆	◆				
			Metals: Ar, Cu, Cr	◆	◆	◆	◆	◆	◆	◆	◆				
			Petroleum Aromatic Hydrocarbons (PAH)	◆	◆	◆	◆	◆	◆	◆	◆				
CJD MW-2	Upgradient of SIG	Groundwater	pH, Cond., Temp.	◆	◆	◆	◆	◆	◆	◆	◆				
			Metals: Ar, Cu, Cr	◆	◆	◆	◆	◆	◆	◆	◆				
			Petroleum Aromatic Hydrocarbons (PAH)	◆	◆	◆	◆	◆	◆	◆	◆				
CJD MW-3, 4, 5	Downgradient of SIG	Composite Groundwater (Three Monitoring Wells)	pH, Cond., Temp.	◆	◆	◆	◆	◆	◆	◆	◆				
			Metals: Ar, Cu, Cr	◆	◆	◆	◆	◆	◆	◆	◆				
			Petroleum Aromatic Hydrocarbons (PAH)	◆	◆	◆	◆	◆	◆	◆	◆				

Footnotes:

[1] Temp., Conductivity, pH, nitrate, dissolved organic carbon (DOC), other major cations and anions (Na, Mg, K, Ca, SO4, Cl) , hardness, alkalinity.

3 Sample Collection and Analysis Program

The following section describes the Sampling and Analysis Program (SAP) procedures to be used for both sampling phases. The goal of the SAP is to produce accurate, reliable, and robust water quality data by defining procedures involved with the following processes:

- Surface water and Effluent sampling procedures,
- Groundwater sampling procedures,
- Composite sampling procedures,
- Equipment decontamination procedures,
- Sample packing and shipping,
- Analytical laboratory procedures,
- Record keeping and chain of custody (COC),
- Quality assurance.

3.1 Monitoring and Sample Collection Methods

The following section outlines the procedures that will be used to record water quality conditions in the field, collect surface water and groundwater samples, and transport the samples to the lab for testing.

3.1.1 Field Recording and Documentation

Observations and actions during quarterly monitoring and sampling events will be recorded in daily activity logs and sampling logs. As part of the WPCF Monitoring Plans, example field forms have been prepared for use by City staff during sampling events (Attachment 2). These forms will also be used for this Conservation Measure Monitoring Program. Forms will be duplicated and stored in digital and physical copies at the City WWTP office.

3.1.2 Instrument Care and Calibration

Field water quality parameters will be measured in the field at the time of sampling using portable field meters: temperature, pH, and conductivity. Field thermometers do not require regular calibration. The probes used to measure pH and conductivity will be calibrated within no more than 48 hours of the sampling event. Calibration of field meters will follow the manufacturer's recommendations and frequencies and will be used in compliance with operating instructions and decontamination procedures.

All field measurement and sampling equipment will be decontaminated after each use.

3.1.3 Equipment Decontamination Procedures

In order to minimize the chances of cross-contamination, equipment must be appropriately cleaned in between sampling events and well sites. Non-dedicated water quality monitoring equipment should be decontaminated before and after monitoring using the following procedure:

- Wipe with a clean paper towel,
- Rince with potable water,
- Wash with a lab-grade detergent such as Alconox,
- Rince with distilled or filtered water.

Non-dedicated equipment used for groundwater sampling (submersible pump, tubing, sample splitter, etc.) will be decontaminated between sampling events using the following procedure:

- Wipe with a clean paper towel,
- Rince with potable water,
- Cycle water with a lab-grade detergent, such as Alconox through the pump and sample tubing,
- Scrub to remove dirt and debris,
- Rince with distilled or filtered water,
- Cycle distilled water through the pump and tubing.

3.1.4 Surface Water Sampling

Grab samples will be collected by directly filling sample bottles from the river. A depth integrated sampling device may be used. Samples will be collected in at least 2 ft of water (unless low-flow conditions do not exceed this depth) and at least 3 ft from the river bank. Sample bottles will be lowered into the river while angled downstream until water begins to flow into the bottle. If the staff collecting the sample must wade into the river, the sample bottle will be filled on the upstream side of where the sampler is standing. The sampler will attempt to incorporate water from a variety of depths within the water column.

Care will be taken to avoid stagnant water (at low-flow periods) and disturbed sediment when collecting grab samples. Field parameters such as temperature, pH, and conductivity will be measured in the river at the time of sampling and recorded on a sampling data sheet.

In the case that a composite sample is required (SW-2A), multiple 1 liter samples will be collected in the manner described above. A churn splitter or similar device will be used to mix and split the samples into one representative sample bottle.

3.1.5 Monitoring Well Purging and Sampling

Field personnel will complete a general inspection of each monitoring well before each sample event. The visual inspection will generally consist of checking the above-ground casing for weather damage, evidence of tampering, deterioration, or entry of animals into the casing. The results of the inspection will be recorded on a Well Inspection form.

A minimum of ten well volumes will be purged from the well casing before groundwater samples are collected. Field personnel will determine the well volume before each sampling event by taking a depth measurement accurate to 0.01 ft and applying the formula below with the known well construction details.

$$V = 0.041 \times D^2 \times H$$

V is one well volume in gallons
D is the well diameter in inches

H is the length of the water column in feet *(depth of well + measurement point height – depth to water)*

Given the shallow depth of the alluvial aquifer and the proposed monitoring well depths, a well volume will generally be between 1.0 and 3.0 gallons. The wells will be purged before sampling at a low rate of <2 gpm if possible. During purging, the field personnel will measure temperature, pH, and electrical conductivity regularly to determine when groundwater quality stabilizes. A depth-to-groundwater measurement will be collected each time field parameters are recorded.

The volume purged from each well, the water quality parameters, and the depth to groundwater in the well will be recorded on a well purging sheet accompanying each groundwater sample data sheet. Samples will be collected after at least ten well volumes have been pumped and parameters have stabilized. The same pump will be used for both purging the well and collecting groundwater samples. A final temperature, pH, and conductivity reading will be collected at the time of sampling.

3.1.6 Sample Measurement and Collection

Care should be taken not to splash water into the sample bottles or introduce air into the sample during collection. Samples should not be transferred from one sample container to another to avoid cross-contamination and aeration of the sample. Samples will be collected in a manner that reduces the risk of sample contamination, including:

- Opening the sample bottles only immediately before the sample is collected.
- Minimizing agitation of the sample bottles once placed in the transport container.

In the case that a composite sample is required (Operational Phase downgradient wells, for example), multiple 1 liter samples will be collected in the manner described above. A churn splitter or similar device will be used to mix and split the samples into one representative sample bottle.

Each sample bottle will have a label containing the following information in permanent marker:

- Sample site number and sample ID number,
- Date and time of collection,
- Analytical lab receiving the samples.

The personnel collecting the samples will enter matching information on a sampling field form and a chain-of-custody (COC) form. A lab-provided COC form will also be filled out and included with the samples in the transport container.

3.2 Analytical Methods

The City has not determined which laboratory facility will be used for sample analysis. Due to the very low detection limits required for some parameters (such as metals), specialized lab services are necessary. All analyses may not be performed at the same lab. For example, metals and petroleum analytes may have to be sent to separate specialty labs. The selected labs will be nationally certified and Oregon Certified if possible.

3.2.1 Laboratory Methodologies

The proposed analytical methods for laboratory-tested water samples are listed in Tables 4 through 6.

Table 4 – Proposed Analytical Methods for Metals and TPH		
Required Parameter	Analytical Method Proposed	Detection Limit[1]
Aluminum	EPA 200.8	4.51 ppb
Arsenic		0.35 ppb
Copper		0.08 ppb
Cadmium		0.10 ppb
Chromium III (as Total-Cr)		0.21 ppb
Nickel		0.10 ppb

Zinc		0.26 ppb
TPH-Dx	NWTPH-Dx	80 ppb (diesel) 200 ppb (lube oil)
TPH-Gx	NWTPH-Gx	100 ppb

1. *Based on information provided by specialty analytical labs in the region.*

Table 5 – Proposed Analytical Methods for Polycyclic Aromatic Hydrocarbons		
PAH Component	Analytical Method Proposed	Detection Limit[1]
Acenaphthene	EPA 8270 E[2]	0.032 ppb
Acenaphthylene		
Anthracene		
Benz(a)anthracene		0.016 ppb
Benz(a)pyrene		
Benzo(b)fluoranthene		
Benzo(k)fluoranthene		
Benzo(g,h,I,)perylene		0.032 ppb
Chrysene		0.016 ppb
Dibenz(a,h)anthracene		
Fluoranthene		0.032 ppb
Fluorene		
Indeno(1,2,3-cd)pyrene		0.016 ppb
1-Methylnaphthalene		0.064 ppb
2- Methylnaphthalene		
Naphthalene		
Phenanthrene		
Pyrene		0.032 ppb
Carbazole		
Dibenzofuran		

1. *Based on information provided by specialty analytical labs in the region.*
2. *An alternative method is EPA 625.1, which has detection limits below 0.05 ppb for all components.*

Table 6 – Proposed Analytical Methods for Other Parameters		
Required Parameter	Analytical Method Proposed	Detection Limit[1]
Calcium	EPA 200.7	0.012 ppm
Magnesium		0.012 ppm
Sodium		0.028 ppm
Potassium		0.128 ppm
Sulfate	EPA 300.0	0.020 ppm
Chloride		0.020 ppm
Nitrate-N	SM 4500-NO3 D EPA 9056	0.14 ppm <0.1 ppm
Hardness	SM 2340 B	1.0 ppm
Alkalinity	SM 2320 B	2.0 ppm
Dissolved organic C	SM 5310 C	0.100 ppm

1. *Based on information provided by specialty analytical labs in the region.*

3.2.2 Establishment of Toxicity Limits

The metals and petroleum components specified in Tables 1 and 2 will be monitored in groundwater and surface water as part of this program. However, the analysis results from these two water sources will be compared to different concentration standards for toxicity. Background concentrations measured at the proposed monitoring sites supersede established water quality standards.

The groundwater quality in the alluvial aquifer is not directly comparable to the aquatic environment in the John Day River. The results of groundwater sampling and analyses will be compared to established Human Health Water Quality Criteria for Toxic Pollutants (OAR 340-041-8033(Table 40)) (Table 7). The concentration criteria listed in Table 7 are those for "water + organism", which are intended to protect drinking water, fish, and shellfish where domestic water supply is of concern. For parameters not included in OAR 340-041-8033(Table 40), such as Arsenic, Cadmium, and Chromium, the EPA primary or secondary drinking water standards are included in Table 7.

Surface water sampling results from the John Day River will be compared to aquatic health standards for fish as determined by the Preconstruction Phase sampling and BLM model analysis. Established Aquatic Life Water Quality Criteria for Toxic Pollutants for freshwater (OAR 340-041-8033(Table 30)) are hardness-dependent and are calculated based on the formulas presented in Table 7. Because many of the metals are hardness- or pH-dependent, the toxicity limits will change for each sampling event. The toxicity levels for copper are only obtainable with the BLM model, which will be run based on the water quality data from each sampling event.

Table 7 – Toxicity Limits for Metals and Petroleum Components

Metal	Human Health Criteria (OAR 340-041-8033 Table 40)	Freshwater Aquatic Health Criteria (OAR 340-041-8033 Table 30)	
		Acute	Chronic
Aluminum (Al)	200 ppb[1]	*See below.*	
Bioavailability is affected by pH, dissolved organic carbon, and total hardness. The Aluminum Criteria Calculator will be used to determine values based on site data. Surface water only.			
Arsenic (As)	2.1 ppb	340 ppb	150 & 10 ppb
The criterion is expressed in terms of dissolved concentrations in water column and is applied as total inorganic arsenic (arsenic (III) + arsenic (V). A chronic value of 10 ug/L dissolved will be used to evaluate the dietary pathway for protection of fish. Groundwater only.			
Copper (Cu)	1300 ppb	*See below.*	
The freshwater CMC and CCC criteria for this metal is expressed as dissolved with two significant figures. Criteria are calculated using the Biotic Ligand Model (BLM) and are a function of multiple parameters. Surface water only.			
Cadmium (Cd)	5 ppb[2]	*See below.*	
For acute, use the formula CMC = (exp(mA[ln(hardness)] + bA)) * CF where mA = 0.9789, bA = -3.866, CF =1.136672-[(ln hardness)(0.041838)].* *For chronic, use the formula CCC = (exp(mC*[ln(hardness)] + bC))*CF where mC = 0.7409, bC = -4.719, CF = =1.101672-[(ln hardness)(0.041838)].*			

"CF" is the conversion factor used for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. Surface water only.			
Chromium (Cr) III	100 ppb[2,3]	*See below.*	
For acute, use the formula CMC= (exp(mA[ln(hardness)] + bA))*CF where mA = 0.8190, bA = 3.7256, CF= 0.316. For chronic, use the formula CCC = (exp(mC*[ln(hardness)] + bC))*CF where mC = 0.8190, bC = 0.6848, CF= 0.860.* *"CF" is the conversion factor used for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. Groundwater only.*			
Nickel (Ni)	140 ppb	*See below.*	
For acute, use the formula CMC= (exp(mA[ln(hardness)] + bA))*CF where mA = 0.8460, bA = 2.255, CF=0.998. For chronic, use the formula CCC = (exp(mC*[ln(hardness)] + bC))*CF where mC = 0.8460, bC = 0.0584, CF=0.997.* *"CF" is the conversion factor used for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column. Surface water only.*			
Zinc (Zn)	2100 ppb	*See below.*	
For acute, use the formula CMC= (exp(mA[ln(hardness)] + bA))*CF where mA = 0.8473, bA = 0.884, CF= 0.978. Cor chronic, use the formula CCC = (exp(mC*[ln(hardness)] + bC))*CF where mC = 0.8473, bC = 0.884, CF= 0.986.* *"CF" is the conversion factor used for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column.*			
TPH-Dx	-	2.12 ppm[4] / *NA*[5]	3.14 ppm[6] / 0.64 ppm
Northwest total petroleum hydrocarbons, diesel range organics. Petroleum products applicable for this include jet fuels, kerosene, diesel oils, hydraulic fluids, mineral oils, lubricating oils and fuel oils. Total TPH-Dx is not included in Table 40 or in EPA drinking water standards. Surface water only.			
TPH-Gx	-	1.0 ppm[4] / *NA*[5]	2.1 ppm[6] / 0.44 ppm
Northwest total petroleum hydrocarbons, gasoline range organics. Petroleum products applicable for this method include aviation and automotive gasolines, mineral spirits, Stoddard solvent and naphtha. Total TPH-Gx is not included in Table 40 or in EPA drinking water standards. Surface water only.			
PAHs	N/A	*N/A*	
PAH (polyaromatic hydrocarbon) analysis consists of low and high molecular weight PAHs and would be analyzed only on select groundwater samples. Toxicity levels were not provided by the Services for PAHs. Only select PAH compounds have established aquatic or human health criteria. PAH samples from groundwater will be used primarily for comparison of operations to background conditions. Groundwater only.			

1. *EPA Secondary Drinking Water Standard*
2. *EPA Primary Drinking Water Standard or Action Level*
3. *Concentration limit for total Chromium*
4. *No Observed Effect Concentration for growth of topsmelt*
5. *Acute limits are not established for TPH-diesel range (Dx) or for TPH-gas range (Gx).*
6. *Lowest Observed Effect Concentrations for growth of topsmelt*

3.2.3 Determination of Background Levels

Measured concentrations of all parameters listed in Table 7 during operations will be compared to background levels. The USFWS defined background level as 95% of the upper confidence level (UCL) for the first year of quarterly sampling (n=4). For this analysis, samples will be grouped by source (groundwater vs surface water) and also by location (up- vs down-gradient, etc.). Background levels will be established after the first year of background monitoring.

3.3 Quality Assurance and Quality Control

The following section outlines the steps taken in the surface water and groundwater monitoring program to ensure data quality from samples delivered to the analytical laboratory.

3.3.1 Sample Handling and Chain of Custody

Possession and transport of surface water samples will be traceable from the time of sample collection in the field to the receiving laboratory. Documentation begins at sample collection with proper labeling on sampling containers, annotation on field forms, and by filling out a laboratory-supplied COC form. The COC forms will be included with the sample bottles in the transport container.

Surface water samples that are sent to an analytical laboratory for analysis will be placed in a cooler containing ice or ice packs to maintain a maximum sample temperature of 4°C, or will be preserved otherwise in a manner consistent with sampling procedures. Once sample bottles are sealed in the field, they will not be reopened until they are received at the lab and are processed for analysis. The sample cooler will be transported or shipped to the receiving laboratory on the same day as the samples are collected.

3.3.2 Laboratory Quality Assurance

The laboratory selected and used for analytical testing will follow the current National Environmental Laboratory Accreditation Program standards and carry accreditation from the State of Oregon, or other state, through their environmental laboratory accreditation program.

4 Data Analysis and Reporting

The City will submit surface water and groundwater monitoring reports to the lead agency for the BA, the United States Department of Agriculture (USDS) on an annual schedule and within 60-days following January 1st of each year. Each monitoring report shall present the water quality monitoring activities performed as prescribed by this Plan. All reports will be prepared in compliance with this Plan. The reports will be submitted to the USDA or other agency contact person provided by the lead agency, in an appropriate digital format.

4.1 Statistical Analysis

Quarterly data collection will include information on the condition of the monitoring points, parameters measured in the field and analyzed in the lab, notes on sample collection and handling activities, and a map of the monitoring network. Annual reports will also include numerical and graphical presentations of water quality data. Copies of the original lab reports will be included in annual reports as appendices.

Statistical methods applied to surface water reporting will change over time as more data points become available. For example, performing most statistical analysis will not be possible until at least four quarters of data are collected. However, early monitoring data will be compared to available background data collected from the river prior to WWTP operations and will be discussed in the context of establishing baseline water quality ranges for each parameter.

4.1.1 Analytical Methods

The water quality values measured in the field and laboratory during each Operational Phase quarterly sampling event will be compared to the mean or median (dependent on normality) and overall range of Preconstruction Phase background values for that parameter. After at least four quarters of data are available, a ***Shapiro-Wilkes*** analysis will be used to determine if sampling data are normal. Parameters exhibiting a normal distribution will be compared by mean, while non-parametric datasets will be compared by median. Early sampling data is assumed to be nonparametric and will be compared by median. Each Operational Phase quarter's data will be compared to Preconstruction Phase background and earlier Operational Phase quarterly data in multiple ways. For example, the value for a given parameter and sampling site and event will be evaluated by:

- Comparing the value to all Preconstruction Phase background data,
- Comparing the value to all previous Operational Phase sampling values across all sites,
- Comparing the value to all previous Operational Phase sampling values at the same sampling site,
- Comparing the value to all previous data from that sampling quarter (seasonal comparison),
- Comparing the value to value from other sites during that sampling event.

Evaluating the data as stated above will allow the City to identify continuous trends, seasonal trends, spatial trends, and outlier events in water quality. Outlier events will be identified by performing a ***one sample t-test*** or similar statistical analysis to determine if a value is significantly different than the previously measured values. Simple linear regression or similar statistical analyses may be applied to determine if there are long-term temporal trends.

4.2 Reporting

Quarterly water sample analysis data and statistical analyses will be presented to the Services through the designated lead agency on a yearly basis in an annual monitoring report. The report will be due within 60 days following the receipt of the complete fourth quarter laboratory analysis results.

CwM-H2O
Complete Water Management

1319 SE MLK Jr. Blvd, Suite 204
Portland, Oregon 97214
(503) 954-1326

Figure 1
City Wastewater Treatment Plant & GW Flow in the Alluvial Aquifer System

No.	Date	By	Revisions
1	DATE	AUTH	DRAFT

N

0 500 1,000 2,000 ft

1" = 1,170'

Proj#: 2111005
CJD Monitoring Plans

City of John Day

- Percolation Ponds
- Alluvial Aquifer Model Boundary
- Possible Discharge Reaches
- Primary Discharge Zone
- General Groundwater Flow Paths

CwM-H2O
Complete Water Management

1319 SE MLK Jr. Blvd, Suite 204
Portland, Oregon 97214
(503) 954-1326

Figure 2
Phase 1 and Phase 2
Monitoring Locations

No.	Date	By	Revisions
1	DATE	AUTH	DRAFT

N

0 500 1,000 2,000 ft

1" = 1,170'

Proj#: 2111005
CJD Monitoring Plans

City of John Day

- Percolation Ponds
- Alluvial Aquifer Model Boundary
- Possible Discharge Reaches
- Primary Discharge Zone
- Monitoring Locations

CwM-H2O
Complete Water Management

September 20, 2023

RE: Riverbank Access for Quarterly Surface Water Quality Sampling – City of John Day

Dear Resident or Business of the City of John Day,

The City of John Day (City) has been working for several years to develop an updated wastewater treatment facility to replace the aging treatment infrastructure and percolation ponds currently in service. The new wastewater treatment facility is part of the City's larger Innovation Gateway project, which aims to develop recreational areas, community spaces, and locations for the growing hospitality economy and small businesses along the John Day River. In parallel with the Innovation Gateway redevelopment plan, the City has developed a non-potable "purple pipe" water reuse program. Water that is not reused for industrial or irrigation purposes will be infiltrated to the subsurface through infiltration trenches, which requires a Water Pollution Control Facility (WPCF) permit. In May 2022, the City successfully obtained approval of a new WPCF permit from the Department of Environmental Quality and is moving forward with pre-construction planning and water quality monitoring work.

Approval conditions of the City's new WPCF permit require quarterly monitoring of water quality in the John Day River upstream and downstream of the facility. The City does not have direct access to the riverbank from City property west (downstream) of Patterson Bridge Road. At the request of the regulating agencies, the City is seeking permission from private landowners to access the riverbank for quarterly water sampling. Specifically, the City is approaching landowners along the south side of the John Day River between Patterson Bridge Road and the Malheur Lumber facility.

Sampling would be conducted by City staff or environmental consultants on a quarterly basis (likely in March, June, September, and December). The City would provide advanced notice ahead of staff arriving on your property. Sample collection would likely require less than 30 minutes and would involve wading a short distance into the river to gather water in sample bottles.

The City will be monitoring the river for a variety of water quality parameters. These include things like temperature, pH, dissolved oxygen, nutrients, heavy metals, and petroleum products. Monitoring is crucial for ensuring the persistence of a healthy stream environment for fish and other wildlife, as well as human health.

Please review this information and contact the City at the address, email, or phone number below if you are willing to permit the City quarterly access to the river through your property.

Sincerely,

Casey Myers, *Public Works Director*
City of John Day Public Works Department

City of John Day – Public Works
450 East Main Street
John Day, OR 97845
(541) 575-0028
cityofjohnday@grantcounty-or.gov
myersc@grantcounty-or.gov

CwM-H2O
Complete Water Management

Attachment 1
City of John Day Water Quality Monitoring Program
Riverbank Access Authorization

City of John Day Public Works Department

ACCESS REQUEST

As described in the attached cover letter, the City of John Day is seeking willing private landowners to grant access to the John Day River for quarterly water quality sampling. The water quality sampling is related to the City's proposed water treatment plant upgrade and the corresponding WPCF permit.

SCHEDULE

Access would be limited to four site visits per year by City staff or an environmental consultant technician. Site visits would likely take less than 30 minutes to complete and advanced notice would be provided. Monitoring is not expected to continue for a period of more than three years from the first sample collection.

I, _____ (private landowner, print name), DO GRANT the City of John Day quarterly access to the John Day River via my property located at _____ (address) based on the information and conditions described here.

I, _____ (private landowner, print name), DO NOT GRANT the City of John Day quarterly access to the John Day River via my property located at _____ (address) based on the information and conditions described here.

Sign: _____ Date: _____

ATTACHMENT 2 - EXAMPLE FIELD LOGS

WELL SAMPLING LOG

Client: _____
Project: _____
Site: _____
Project Number: _____
Field Personnel: _____
Date: _____

WELL ID: _____

GENERAL INFORMATION				
Term	Description	Units	Derivation	Value
SI	Screened Interval	ft	SI = Interval of well screen	
SU	Stickup Height	ft	SU = Hight of well box/stickup from ground surface	
DP	Depth of Pump	ft	DP = Depth of pump from top of port	

WELL PURGE VOLUME INFORMATION				
Equation for 1 Well Volume: WV = [(WC x PV) + (WC x AV) x FP x 7.48]				
Term	Description	Units	Derivation	Value
TD	Total Well Depth	ft	TD = Initial depth of well	
DTW	Depth to Water	ft	DTW = Initial depth to water	
WC	Water Column Height	ft	WC = TD - DTW	
PV	Pipe Volume	ft^3	PV = (π/4) x (pipe diameter feet)^2 x WC	
AV	Annular Volume	ft^3	AV = [(π/4) x (annular diameter feet)^2 x WC] - PV	
FP	Filter Pack Porosity	%	FP = varying; (generally 30% for sand)	
WV	Well Volume	gal	WV = [(WC x PV) + (WC x AV) x FP x 7.48]	

1 Well Volume : _____ gal

FIELD INSTRUMENT CALIBRATION			
Parameter	Standard Value	Units	Calibration Value
pH	7	-	
Conductivity		mS/cm	
ORP		mV	
DO		mg/L	
Other			

Field Instrument Type: _____

PURGE DATA											
TIME	DTW (ft)	Volume (gal)	Flow Rate (gpm)	Temp. (°F/C)	Ph	Conductivity (mS/cm)	Turbidity (NTU)	Color	ORP (mV)	DO (mg/L)	Particulates

Total Volume Purged : _____ gal
Purged Dry? : yes / no

Type of Pump : _____
Field Parameters Stable? : yes / no

Initial TD : _____
Final TD : _____

SAMPLE INFORMATION			
	Sample ID	Date	Time
Primary			
Duplicate			
Other			

NOTES

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST

Page _____ of _____ COC # _____

Client: _____
Project: _____
Site: _____
Project Number: _____
Sampled By: _____
Receiving Lab: _____
P.O.#: _____

Requested Analytical Method

Turnaround Time

____ Standard
_____ 24 hr. _____48 hr. _____ 3-5 day
_____ 7 day _____14 day _____ day

EDD Data Required?
Yes_____ No_____
Send To: _____

Sample ID	Date	Time	Matrix	Lab ID	No. Containers															Comments

Relinquished by:
Name: Firm:
Signature:
Date: Time:

Received by:
Name: Company:
Signature:
Date: Time:

Shipping Details
Method of shipment:

Airbill #:

Relinquished by:
Name: Firm:
Signature:
Date: Time:

Received by:
Name: Company:
Signature:
Date: Time:

Additional Remarks/Comments:
Report to:

Daily Activity Log

Page 1 of

Client: ____

Project: ____

Site: ____

Project Number: ______________________________________

Field Personnel: ______________________________________

Date: ____

Date	Time	Description of Activity