

City of Yamhill Water Source Study Technical Memorandum

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City of Yamhill Water Source Study

Technical Memorandum

Introduction

The City of Yamhill currently draws raw water from Turner Creek, approximately 7 miles northwest of the City. From the intake structure raw water is gravity piped approximately 200-ft to a wetwell where it is pumped to a mixed media filtration plant and treated. Finished water is gravity piped to the City of Yamhill storage reservoir site approximately 4.5 miles southeast where it is stored in one of two 0.5-MG tanks prior to distribution.

Based on current population as of 2017 and an assumed 2.2% population growth rate, the estimated maximum day water demand is predicted to be 457-gpm in 2037. The current capacity at the mixed media filtration plant is 694-gpm, however the chlorination disinfection system is a limiting factor with a capacity of 440 gpm.

The City owns two surface water rights on Turner Creek with a total maximum allowable draw of 575-gpm. Per the 2018 Water System Master Plan, this rate of water would allow the City's capacity needs to be met for the foreseeable future. Due to seasonal variability in Turner Creek, the City is unable to draw water to the maximum allowable rate per the water right and at times and the City struggles to deliver peak demand to customers. The City is considering making improvements within the existing system or obtaining water from an alternate source to meet the 20-year development peak demand.

The purpose of this report is to identify potential alternatives for additional water sources.

Alternatives Development

Six alternatives were developed based on Yamhill's proximity to surrounding water districts and known deficiencies in the existing water system. Two of the alternatives consist of purchasing water from nearby water districts, the City of Carlton and the City of Hillsboro (member of the Joint Water Commission). Four of the alternatives consist of utilizing the City of Yamhill's existing water right to increase draw from Turner Creek: adding additional wells at the existing intake, adding a new intake downstream on Turner Creek, improvements to the Turner Creek impoundment and improvements to the existing intake. The four alternatives that make modifications within the existing water right can be evaluated independently or as combinations between multiple alternatives as a way of mitigating risk. This could potentially result in the most cost-effective solution based on the relatively minor scope of some of these options.

The City of Yamhill Water System Master Plan (June 2018), the City of Carlton Water Management and Conservation Plan (October 2014) and the City of Hillsboro 2019 Water Master Plan were reviewed for relevant background information to support this study.

Preliminary Alternatives Evaluation

ALT#1 - City of Carlton Intertie

Background

The City of Yamhill is approximately 3.5 miles north of the City of Carlton. The City of Carlton draws raw water from the Panther Creek stream channel as well as the Panther Creek Reservoir which is approximately 10 miles west of the City. Raw water is treated at the Water Treatment Plant Site,

approximately 0.5 miles east of the reservoir. Finished water is piped into the City along NW Panther Creek Road and NW Meadowlake Road. A 1 MG storage reservoir is located approximately 2 miles west of the City. The City of McMinnville (McMinnville Water and Light) has an existing intertie on the City of Carlton transmission main along NW Panther Creek Road. The primary customer bases of both Yamhill and Carlton reside at approximately the same elevation (200 feet Above Sea Level) making this connection ideal from the perspective of hydraulic performance.

ALT #1 - Scope

The City of Carlton Intertie taps into the City of Carlton transmission main in Tualatin Valley Hwy (Hwy 47) at the northern end of the City. The new transmission main travels ±3 miles into the City of Yamhill within the existing abandoned Westsider railroad corridor (Figure 1). This corridor had previously been planned as the Yamhelas Westsider Trail. Prior to the project's land use application being withdrawn in January 2021, the Friends of the Yamhelas Westsider Trail group had completed an unknown level of property acquisition. Utilizing the existing corridor will be the most efficient route as compared to routing through existing right-of-ways. Construction within the existing corridor will result in minimal disruption to existing facilities.

Further Evaluation

The City of Yamhill will need to determine if the City of Carlton is willing to consider selling a portion of their water supply. The City of Carlton's water system has three existing interties with the City of McMinnville, Valley View Water District and the East Carlton Water Company. Their existing water rights on Panther Creek and the Panther Creek Reservoir are adequate for their current and future supply (City of Carlton Water Management and Conservation Plan, October 2014). If the City of Carlton is open to considering the City of Yamhill's proposal, the status of the Yamhelas Westsider Trail group's property acquisition effort will need to be verified.

The City of Carlton is a member of the Yamhill Regional Water Authority along with the Cities of McMinnville, Dayton and Lafayette. As of 2013 this group is conditionally permitted to draw from the Willamette River at a maximum rate of 44.18 cfs to be allocated among the jurisdictions, however the infrastructure has not yet been built to facilitate the draw, treatment or distribution. The group's agreement allocates 2.98 cfs of Willamette River water to the City of Carlton. The City of Carlton intends to use this allocation as redundancy in their system as it is not needed for primary supply.

As a potential additional alternative, it is recommended that the City of Yamhill approach the Yamhill Regional Water Authority to determine their receptiveness to being added to their coalition and what level of the Willamette River water allocation would be available.

ALT#2 - City of Hillsboro Intertie

Background

The City of Hillsboro is a member of the Joint Water Commission (JWC) along with the City of Forest Grove, City of Beaverton and Tualatin Valley Water District (TVWD). The JWC provides wholesale water to the City of Cornelius, City of Gaston and LA Water Cooperative (serves rural Gaston). The City of Gaston provides wholesale water to the unincorporated community of Cove Orchard. The existing City of Hillsboro Upper System transmission main draws raw water from the Haines Falls Intake and runs east along Hillsboro Reservoir Road, SW Lee Falls Road, through Cherry Grove to SW Patton Valley Road where it continues east toward the JWC treatment plant and storage reservoirs approximately 2 miles south of Forest Grove. The City of Hillsboro owns water rights on the Tualatin River which feeds Haines Falls, as

well as for raw water storage in Barney Reservoir. The following identifies three potential opportunities to purchase water supply from the City of Hillsboro/JWC owned water systems.

ALT#2.1 - Scope – Barney Reservoir

The Barney Reservoir is approximately 4 miles northwest of the Yamhill Treatment Plant. The City of Yamhill will purchase and draw water directly from Barney Reservoir and build a transmission main to the existing Yamhill Treatment Plant. The route from the reservoir follows NW North Fork Trask Road and NW Turner Creek Road and will require ±6 miles of new pipeline (Figure 2.1). Depending on the existing water quality and quantity from the storage reservoir, the existing Yamhill Treatment Plant may require a retrofit including an increase to disinfection capacity.

This alternative would require significant easement acquisition and permitting related to connection to Barney Reservoir. For those reasons this does not appear to be a viable alternative.

ALT#2.2 - Scope – Cove Orchard (from City of Gaston)

The City of Gaston is a wholesale customer of the City of Hillsboro/JWC and the unincorporated community of Cove Orchard is a wholesale customer of the City of Gaston. Cove Orchard is approximately 2.8 miles northeast of the City of Yamhill. The existing 4-inch PVC transmission main runs southwest along Hwy. 47 from Gaston to Cove Orchard. Cove Orchard is higher in elevation than the City of Yamhill. The City of Yamhill will construct a new transmission main and connect to the existing main on Hwy. 47 in Cove Orchard. The new main will travel southeast on Hwy. 47 into Yamhill connecting to the existing distribution main at NW Adcock Road and N Olive Street. The total length of new pipeline will be ±3 miles (Figure 2.2).

Further Evaluation

The City of Yamhill will need to determine if the City of Hillsboro and the JWC are willing to consider selling a portion of their water supply, and where the most desirable connection point would be.

ALT#3 - New Well Field at Intake

Background

The existing City of Yamhill water right has a maximum draw of 575-gpm on Turner Creek. If this flow rate were achieved the City's capacity needs will be met for the foreseeable future.

ALT#3 - Scope

To minimize construction of long lengths of new pipeline and potential complications arising from coordination with surrounding jurisdictions, the City will utilize their existing water right and construct a well field consisting of multiple wells drawing from the unconfined aquifer surrounding the existing Turner Creek intake (Figure 3). The number of wells needed will be determined by the cumulative production of each well. Based on the level of flow rate increase into the plant, the treatment facility may require increased disinfection capacity. Depending on well water quality, additional flow may require preliminary treatment at the wellhead.

Further Evaluation

The production level of surface wells in this area is relatively unknown. The City will require a Geotechnical Investigation to determine conditions of the aquifer. The results of such an investigation will have a significant impact on the cost and challenges associated with this alternative.

All new wells to be used as water supply must be permitted through the Oregon Health Authority's Drinking Water Services.

ALT#4 - New Intake at Turner Creek

Background

The City of Yamhill owns an existing 20-ft wide easement that is approximately 1,700-ft long and runs from NW Pike Road to Turner Creek. The intersection of the easement and NW Pike Road is approximately 1,800-ft west of the City of Yamhill storage reservoir site.

ALT#4 - Scope

This easement and the City's existing surface water right will be utilized for a new raw water intake at Turner Creek and transmission main that will connect to the existing City of Yamhill storage reservoirs east of the creek. The intake will require an unknown number of wells based on the production of the unconfined aquifer or a new screened surface water intake from Turner Creek. The raw water will require implementation of a new treatment system to be located at the intake or at the reservoir site. The total length of new pipeline required will be $\pm 3,500$ -ft (Figure 4).

Further Evaluation

The production level of surface wells in this area is relatively unknown. The City will require a Geotechnical Investigation to determine conditions of the aquifer. The results of such an investigation will have a significant impact on the cost and challenges associated with this alternative. A screened surface water intake would likely require a greater degree of water treatment as compared to a shallow well.

All news wells to be used as water supply must be permitted through the Oregon Health Authority's Drinking Water Services.

ALT#5 - Impoundment Improvements

Background

The Turner Creek impoundment is approximately 2.5 miles northwest from the existing intake and stores approximately 30 acre-feet (9.8 MG) of water. The City is permitted to release up to 1 cfs of supplemental flow from the reservoir as necessary to meet demand.

ALT#5 - Scope

Adjustments will be made at the impoundment outlet such that 1 cfs of raw water is released into the Turner Creek stream channel when the water level in the creek is low. There are uncertainties associated with this alternative including 1) capturing an accurate flow measurement leaving the reservoir, 2) quantifying downstream effects on the flow rate at the intake and 3) comprehending how long this additional source will be viable given its storage capacity and seasonal fluctuations. There is also a potential impact on water quality at the intake. There are currently upstream erosion and sedimentation concerns in Turner Creek (City of Yamhill Master Plan, June 2018) that may continue to move downstream and begin to impact the intake structure.

Another consideration for improving the storage at the impoundment would be dredging.

To mitigate the uncertainty of how impoundment release would impact the Turner Creek stream channel, a transmission pipeline could be installed from the impoundment outlet to the Yamhill Treatment Plant within NW Turner Creek Road. This would require ± 3 miles of new pipeline (Figure 5).

Further Evaluation

The City will benefit from an upstream channel study on Turner Creek to comprehend the location and severity of the existing erosion more fully. There will still be uncertainty with respect to the impact on flow rate at the intake and long-term storage levels at the impoundment.

ALT#6 - Intake Improvements

Background

The existing intake structure is oriented vertically in the Turner Creek stream channel and when water level in the creek is low, flow to the intake is restricted due to the structure orientation and depth.

ALT#6 - Scope

Improvements to the intake include re-orienting the screen to be in the horizontal position as well as deepening the structure. The existing location of the intake is such that even by implementing these two improvements, the water level in the creek will still be limiting. To ensure a flow increase regardless seasonal water level fluctuations the intake will need to be relocated into the center of the channel.

Further Evaluation

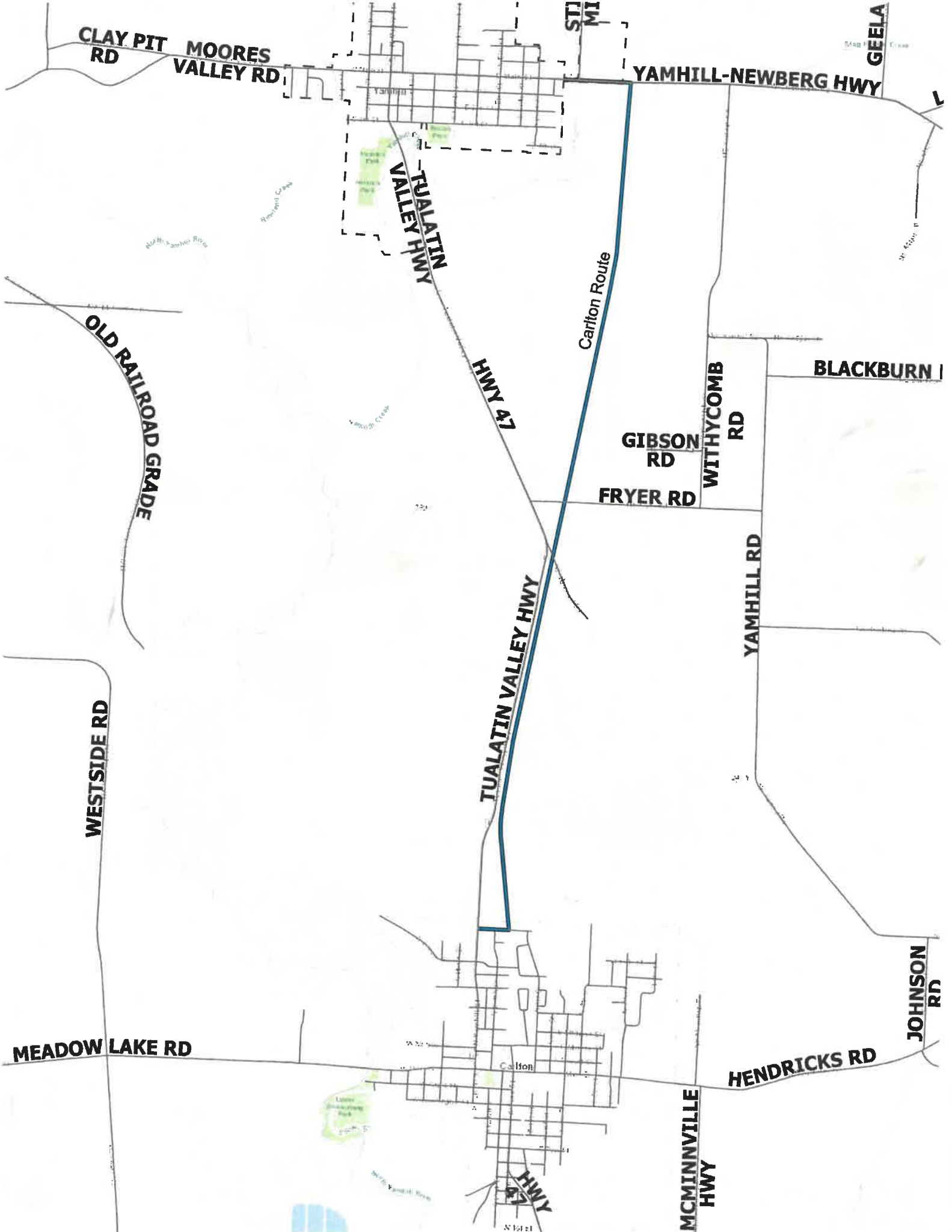
Permitting the modified intake presents the biggest challenge for this improvement option. We recommend evaluating various inlet types and related permitting process to determine the viability of this concept.

Final Project Overview

Alternatives in this report are presented as independent options to be weighed individually, however a combination of multiple alternatives could potentially have the highest impact. Considering the inherent uncertainty in some of the alternatives, it may mitigate risk by having more than one opportunity to facilitate a supply increase. For example, deepening and re-orienting the screen of the intake facility as well as adding some supply wells to the existing intake will mitigate some of the risk if either the Turner Creek water level continues to be low, or the wells are not as productive as anticipated. Jurisdictional interties would not require consideration of multiple alternatives.

The next step for this project is for the City to review the identified alternatives with AKS and decide which alternatives are 'non-starters' and which should be evaluated in greater detail including feasibility level cost estimates.

Appendix: Alternatives Exhibits



CLAY PIT RD
MOORES VALLEY RD

ST MI

GEELA

YAMHILL-NEWBERG HWY

TUALATIN VALLEY HWY

HWY 47

Carlton Route

BLACKBURN I

GIBSON RD

WITHYCOMB RD

FRYER RD

YAMHILL RD

OLD RAILROAD GRADE

WESTSIDE RD

TUALATIN VALLEY HWY

MEADOW LAKE RD

JOHNSON RD

HENDRICKS RD

MCMINNVILLE HWY

HWY 47



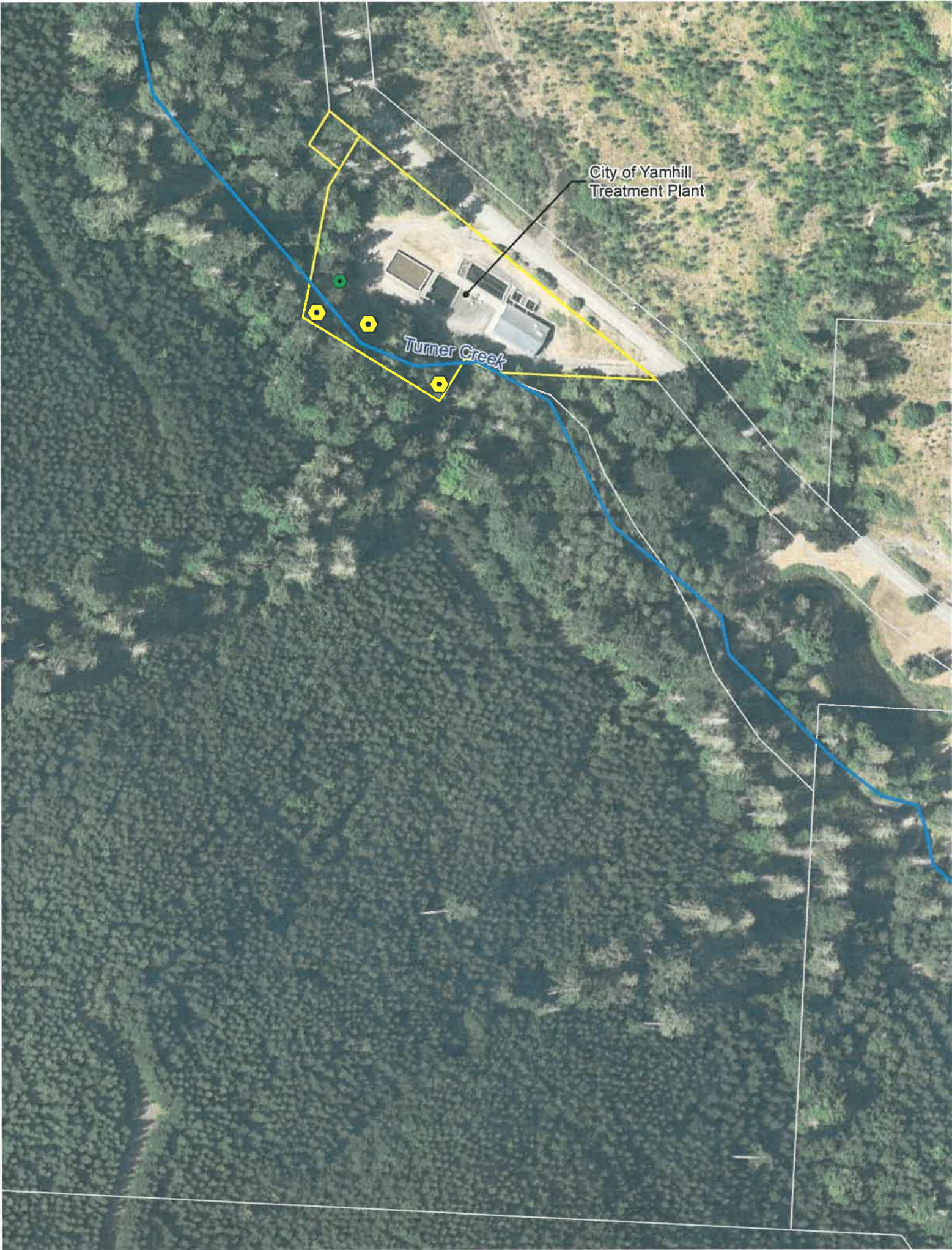
Legend

- Water Right Point of Diversion (POD)
- Proposed Transmission Line



Legend

- Proposed Transmission Line
- - - City Limits



City of Yamhill
Treatment Plant

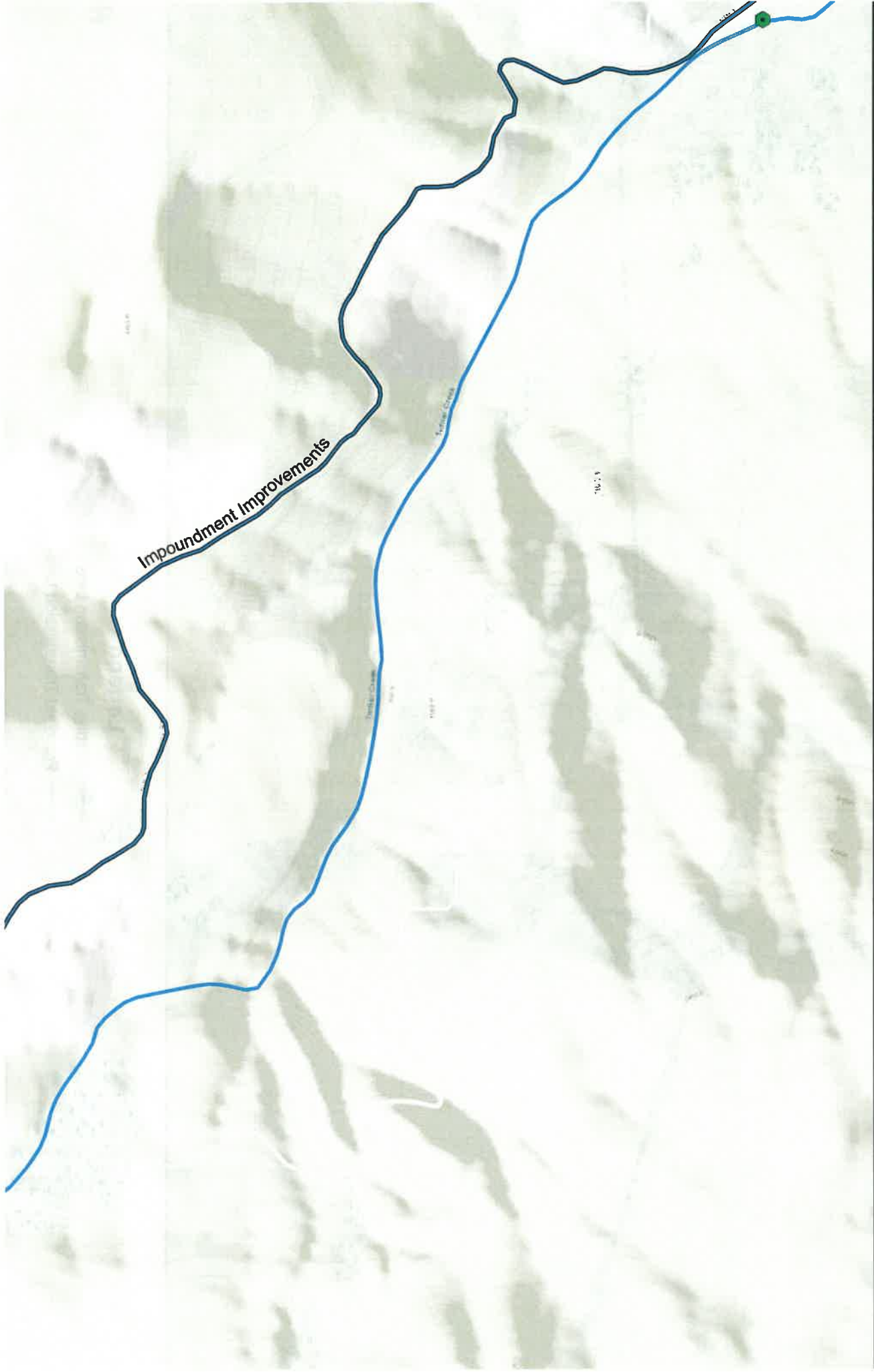
Turner Creek



Legend

Existing Transmission Line

Proposed Transmission Line



Legend

- Water Right Point of Diversion (POD)
- Proposed Transmission Line
- Turner Creek

Imp