

TO: City Council for October 24, 2019, Work Session
FROM: Mary Steckel, Public Works Director *MS*
DATE: October 11, 2019
THROUGH: Mark W. Shepard, P.E., City Manager *MWS*
Nancy Brewer, Finance Director *NB*
SUBJECT: Water Master Plan Update
STRATEGIC OPERATIONAL PLAN PRIORITY: P-3C Complete Water Master Plan



Action Requested:

Staff requests the City Council's input on staff's selected Water Supply Strategy that will be included in the updated Water Master Plan.

Discussion:

The City is in the process of updating the Water Master Plan (WMP). A significant component of the WMP project is the development of a Water Supply Strategy (WSS). The purpose of the WSS is to plan water system improvements to achieve the projected 50-year drinking water needs of the city, while also meeting the City's selected redundancy and resilience goals. The project team (consultants and staff) evaluated and modeled the city's future water demands and established desired levels of service following a disaster using the Oregon Resilience Plan.

The WSS needs to meet:

- The 50-year Maximum Daily Demand (MDD) projection, which is 30 million gallons per day (mgd).
- The redundancy goal, which is to provide 7.5 mgd of potable water for three days with the largest water treatment plant (i.e. Taylor Water Treatment Plant) out of service. The 7.5 mgd target was selected as it is the projected winter water demand in the year 2063.
- The resilience level of service goals:
 - 7.5 mgd of potable water.
 - Uninterrupted potable water service during a 500-year flood.
 - Back-up power and chemical storage to provide 7.5 mgd for three days if regular power or chemical supply is unavailable.

The project team developed eight different approaches to meeting the WSS objectives. The alternatives were evaluated (scored) on a series of criteria by subject matter experts on the consulting team. Those scores were then adjusted using the Corvallis specific weighting factors reviewed with the City Council in August. The adjusted final scores were used to help guide the selection of a WSS alternative.

An overview of each alternative considered follows: (See attachment CC-A for additional detail.)

Alternative #1 – Meet the seismic resiliency goal at the Rock Creek Water Treatment Plant (WTP). This alternative focused on meeting the resilience goals using the Rock Creek WTP only. Because there is not 7.5 mgd of water available year-round on the Rock Creek watershed, Alternative #1 is unable to meet one of the resilience goals and was eliminated from consideration.

Alternative #2 – Maximize the value of existing water rights from the Rock Creek watershed.

This alternative aimed to utilize the available water rights on the watershed through new diversion points and a new larger water treatment plant. This alternative also includes a new waterline from the watershed to Corvallis, but not one that is seismically hardened.

Alternative #3 – Redundancy in seismic resiliency.

This alternative looked to have two seismically resilient water treatment plants. This includes new seismically resilient infrastructure at Rock Creek and increasing the treatment capacity at the Taylor WTP to 25 mgd, with new seismically resilient infrastructure.

Alternative #4 – Focus investments at the Taylor WTP.

This alternative looks to the Taylor WTP alone to achieve the WSS objectives. All future water treatment capital expenditures would be at the Taylor WTP and the treatment capacity would be increased to 30 mgd. The Rock Creek WTP would discontinue operation at some point in the future when basic ‘repair and replacement’ maintenance is no longer financially feasible. Having two water sources was a high priority for the public in the survey results. This alternative results in just one water source, and so it was eliminated from consideration.

Alternative #5 – Redundancy in raw water supply, focus investments at the Taylor WTP.

This alternative places all future water treatment capital expenditures at the Taylor WTP location, increasing the treatment capacity of that plant to 30 mgd. The Rock Creek WTP would discontinue operation at some point in the future when basic ‘repair and replacement’ maintenance is no longer financially feasible. A new pipeline from the Rock Creek watershed would be constructed to the Taylor WTP with raw water from the watershed sources treated at Taylor WTP.

Alternative #6 – Engage in a regional partnership.

This alternative closes the Rock Creek WTP and moves the Rock Creek water rights to a City of Philomath water treatment plant intake on the Marys River. Corvallis would maintain ownership of the water rights but Philomath would treat and provide water to the Corvallis distribution system.

Alternative #7 – Develop new resilient supplies.

This alternative discontinues operations at the Rock Creek WTP at some point in the future when basic ‘repair and replacement’ maintenance is no longer financially feasible. New sources of water would be developed and could include groundwater (wells), indirect potable use (treated wastewater is placed in a reservoir or aquifer, and drawn out as needed to be treated at the water treatment plant to potable drinking water standards), and direct potable use (treated wastewater is piped directly to the water treatment plant for treatment).

Alternative #8 – Construct a new water treatment plant on the Willamette River.

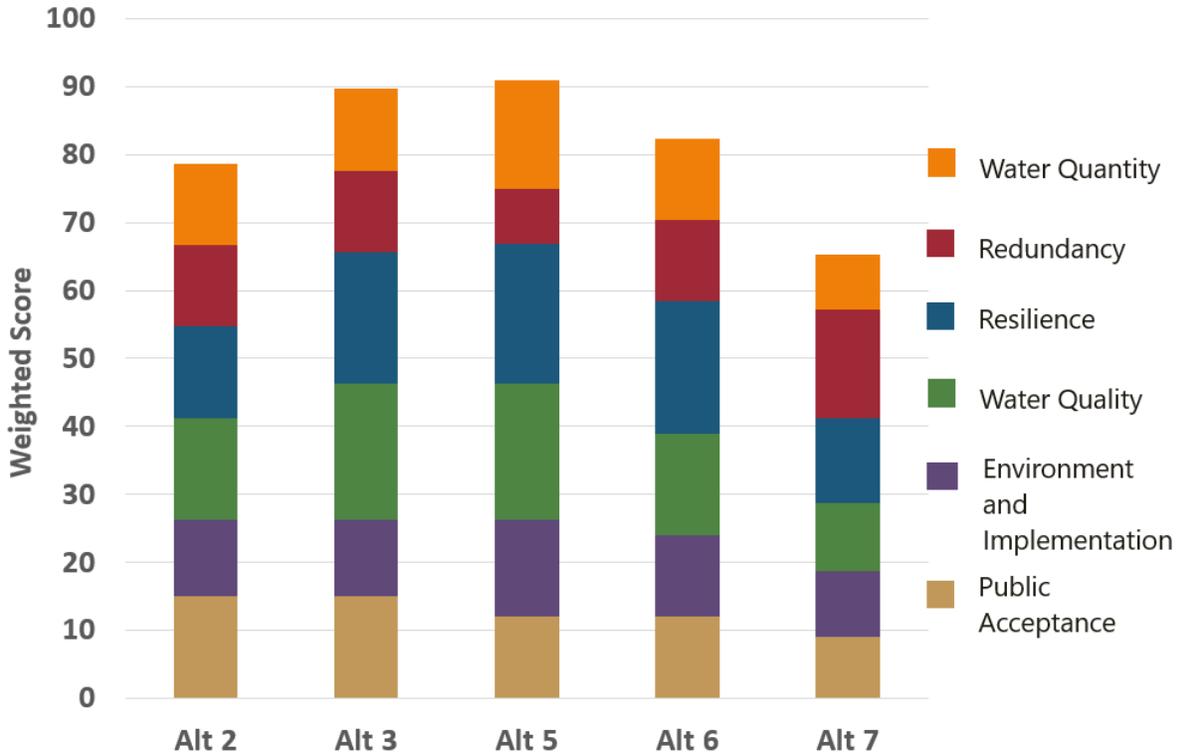
This alternative includes the construction of a new water treatment plant in a new location utilizing a different intake design, and discontinues operations at the Rock Creek WTP when basic ‘repair and replacement’ maintenance is no longer financially feasible. Two water sources/treatment facilities were a high priority for the public in the survey results and because this alternative results in just one water source, it was eliminated from consideration.

WSS Objectives met by each Alternative Strategy

	Water Quantity	Water Source Redundancy	Disaster Resiliency
Alternative 1		√	√
Alternative 2	√	√	√
Alternative 3	√	√	√
Alternative 4	√		√
Alternative 5	√	√	√
Alternative 6	√	√	√
Alternative 7	√	√	√
Alternative 8	√		√

The consulting team’s evaluation results were presented to staff for discussion and review. The chart below reflects how well each of the five viable alternatives was able to meet each criteria category.

Water Supply Strategy Alternatives Scoring



The key difference between Alternatives 3 and 5 is where the raw water from the Rock Creek watershed will be treated. Alternative 3 includes a new water treatment plant on the watershed to replace the existing plant that is aging out. Alternative 5 pipes the raw water from the watershed to an expanded Taylor Plant for treatment. Staff was not comfortable with all of the community’s raw water ending up at one treatment plant location. If something was to happen to that location, there would be no other treatment options to fall back on.

As a result, the discussion among staff and the consultant team centered around Alternative 3. Alternative 3, through the discussion, was modified to include an evaluation of alternate sites for a new treatment plant for watershed raw water that would be located between the watershed and Corvallis. This modification allows time for additional evaluations to determine the best location for this new water treatment facility.

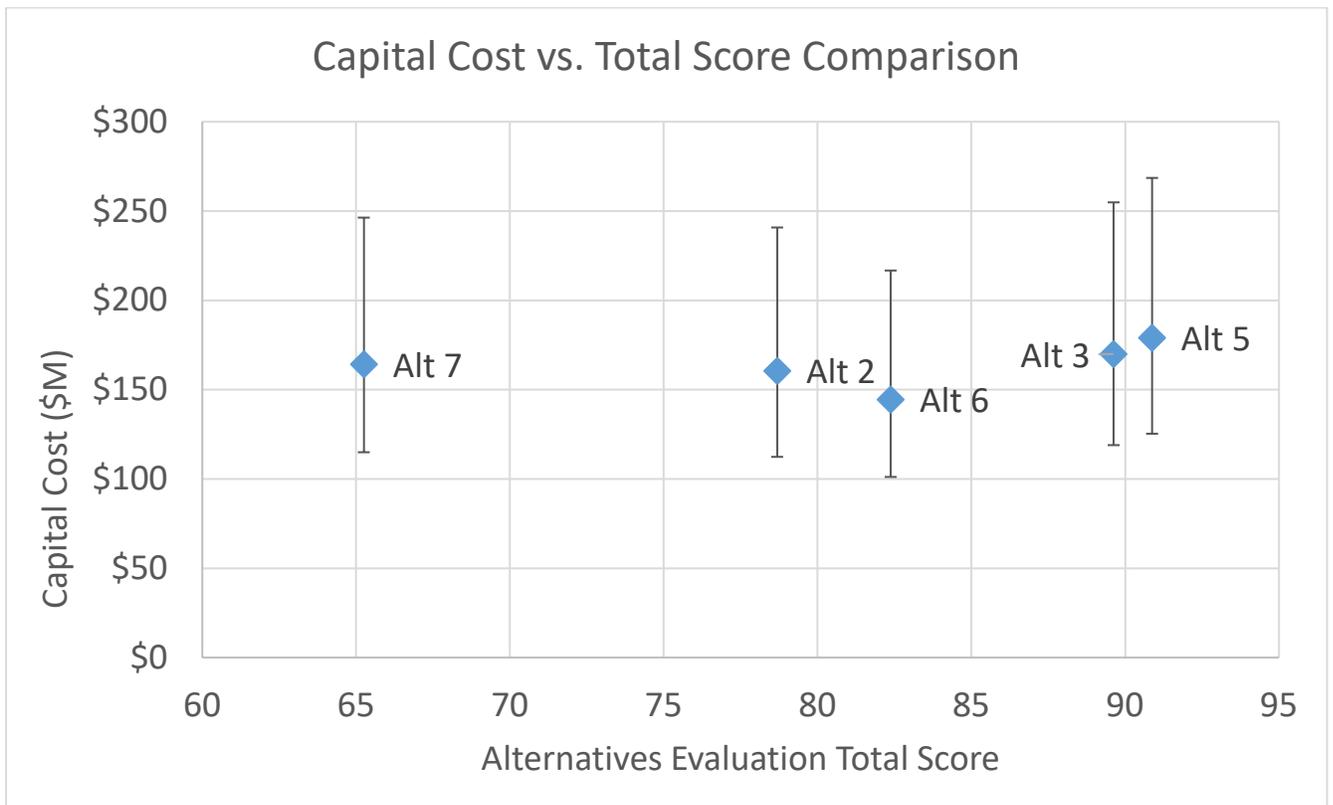
Advantages of the modified Alternative 3

- Allows evaluation of a treatment plant off the watershed where there are currently operational challenges due to its remoteness. Challenges include: weather (snow), limited emergency access, inefficient plant maintenance (travel time, distance from parts inventories), and limited redundant communications.
- Provides redundancy in water sources and water treatment for the community.
- Meets all the objectives of the WSS.

Implications of the modified Alternative 3

- A new treatment plant would be built for the watershed water source (location unspecified).
- A new resilient water line would be built from the watershed to Corvallis.
- A new water intake would be installed on Rock Creek.
- The Taylor WTP would be expanded for additional capacity.
- A new replacement water intake structure would be built at the Taylor WTP.

The estimated costs of each alternative was also evaluated. The estimates between all the options were close, landing between \$145M - \$170M. When contingency for the unknown is added, the range varies from \$100M – 260M.



Staff is seeking Council comments/questions on staff's recommendation to pursue a modified Alternative 3 for the Water Master Plan WSS.

Budget Impact:

There is no FY2019/2020 budget impact. Long-term water system Capital Improvement Project budgets will be driven from the WSS. Increasing customer rates and/or other funding mechanisms would likely be required in the future to construct the infrastructure needed to provide a reliable future potable water supply.

Attachment:

CC-A - Water Supply Strategy Alternatives Overview

Water Supply Strategy Alternatives Overview

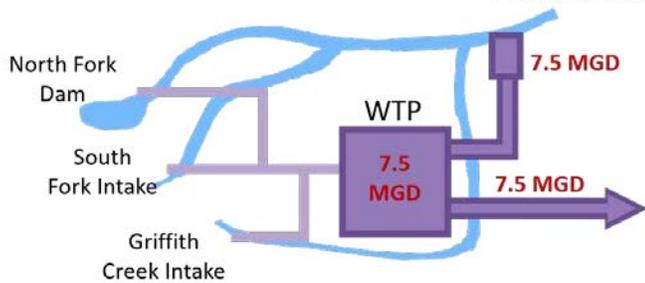
The following eight strategies were evaluated to meet the City's long-term water supply goals.

Alternative 1 – Meet Seismic Resiliency Goal at Rock Creek WTP -- **Removed from consideration, DOES NOT MEET RESILIENCE GOAL.**

Rock Creek

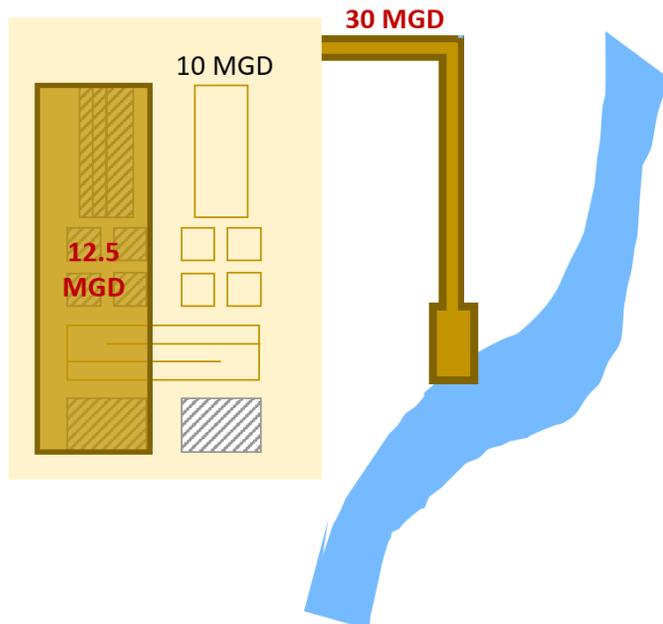
- Total water rights: 7.5 mgd (winter)/5.2 mgd (summer).
- Construct new seismically resilient 7.5 mgd WTP.
- Seismically harden North Fork Reservoir.
- Seismically harden finished water piping to Baldy Reservoir.

Winter: 7.5 MGD
Summer: 5.2 MGD



Taylor

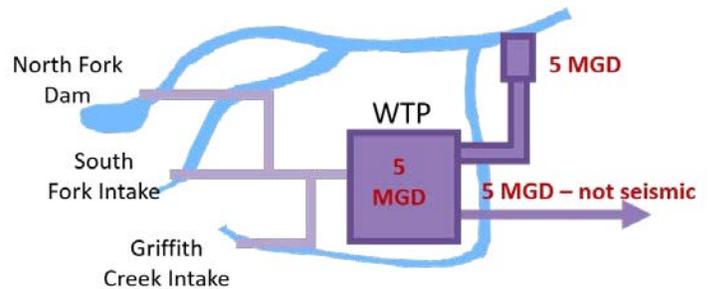
- Replace intake and raw water piping (seismically resilient).
- Expand Taylor to 22.5 mgd.



Alternative 2 – Maximize Value of Existing Rock Creek Water Right

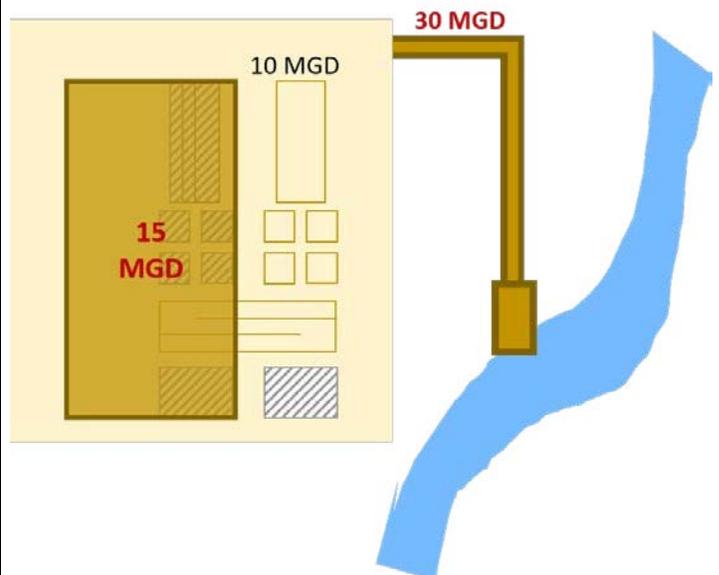
Rock Creek

- Move Points of Diversion (POD) to Rock Creek and construct new intake on Rock Creek.
- Construct new seismically resilient 5 mgd WTP.
- Seismically harden North Fork Reservoir.



Taylor

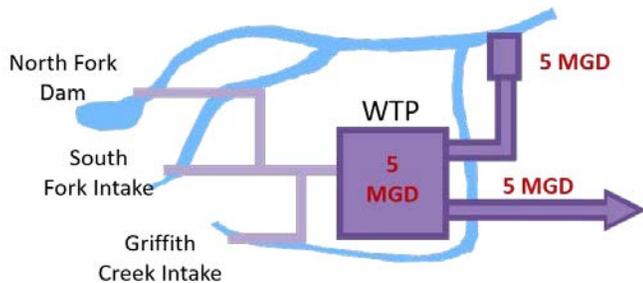
- Replace intake and raw water piping (seismically resilient).
- Expand Taylor to 25 mgd.



Alternative 3 – Redundancy in Seismic Resiliency

Rock Creek

- Move PODs to Rock Creek and construct new intake on Rock Creek.
- Construct new seismically resilient 5 mgd WTP.
- Seismically harden North Fork Reservoir.
- Replace finished water piping to Bald Hill Reservoir (seismically resilient).



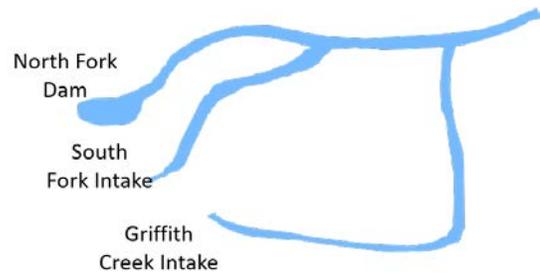
Taylor

- Replace intake (seismically resilient).
- Expand Taylor to 25 mgd.

**Alternative 4 – Focus Investments at Taylor WTP --
Removed from consideration, DOES NOT MEET
REDUNDANT SUPPLY GOAL.**

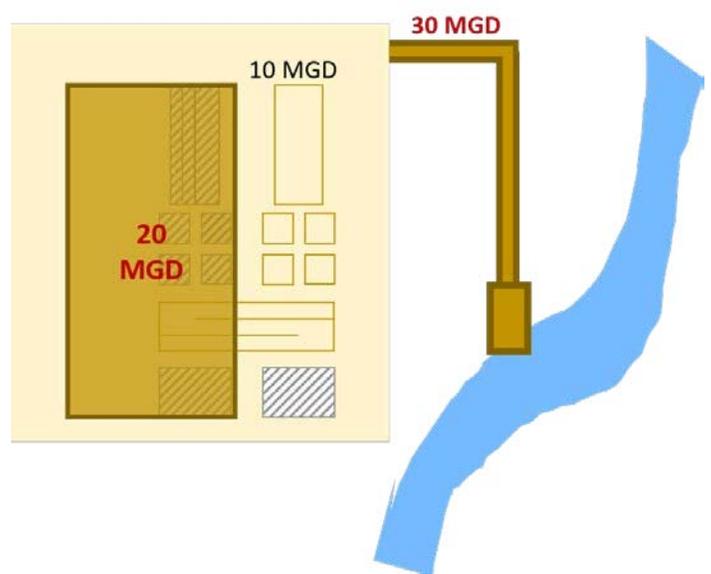
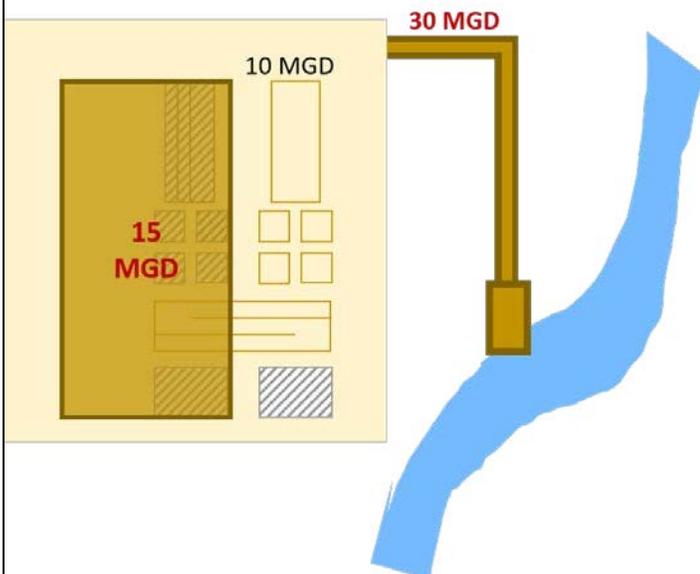
Rock Creek

- Continue with current treatment scheme.
- Rock Creek WTP ages out of operation over the 50-year planning period.



Taylor

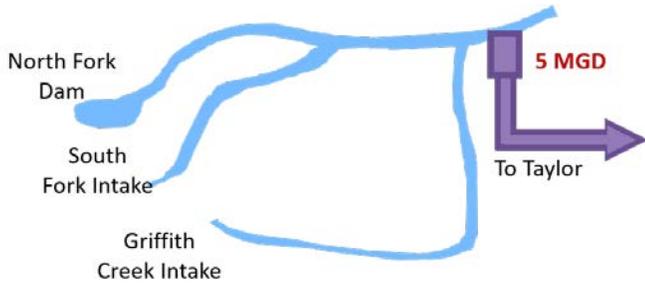
- Replace intake (seismically resilient).
- Expand Taylor to 30 mgd.



Alternative 5 – Redundancy in Raw Water Supply, Focus Investments at Taylor WTP

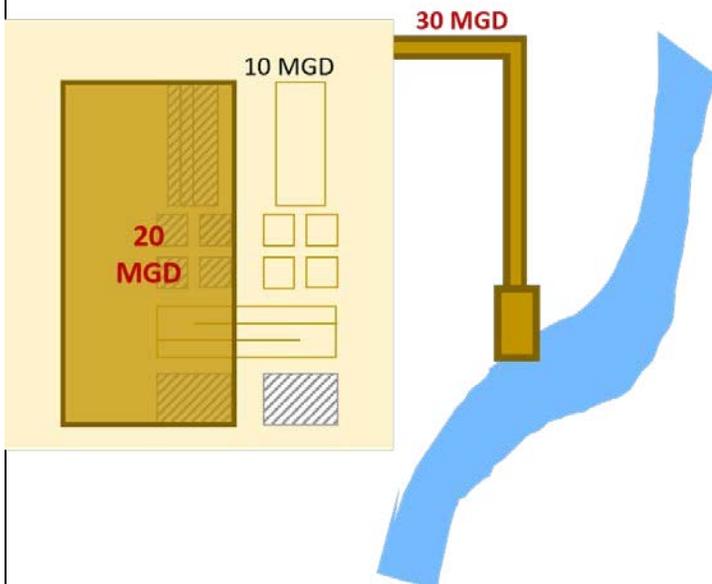
Rock Creek

- Move PODs to Rock Creek and construct new intake on Rock Creek.
- Pipe raw water to Taylor WTP location for treatment (5-mgd capacity, seismically resilient).



Taylor

- Replace intake (seismically resilient).
- Expand Taylor location to 30 mgd:



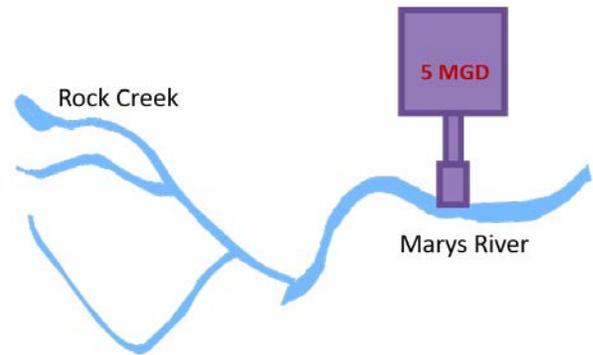
Alternative 6 – Engage in a Regional Partnership

Rock Creek

- Cease Water Treatment Plant operations.

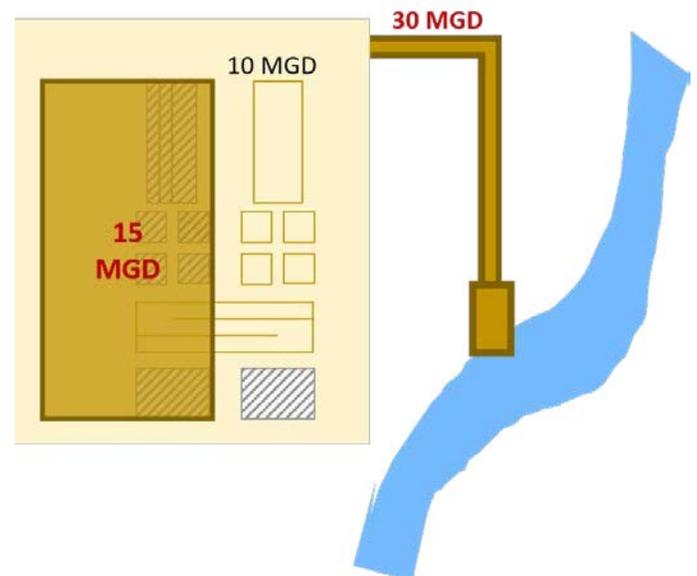
Regional Partnership

- Partner with Philomath on a new seismically resilient Marys River WTP.
- Construct a new intake on the Marys River.
- Transfer Rock Creek water rights PODs to Marys River.
- Replace finished water piping to Baldy Reservoir (5 mgd capacity, seismically resilient, 3 miles).



Taylor

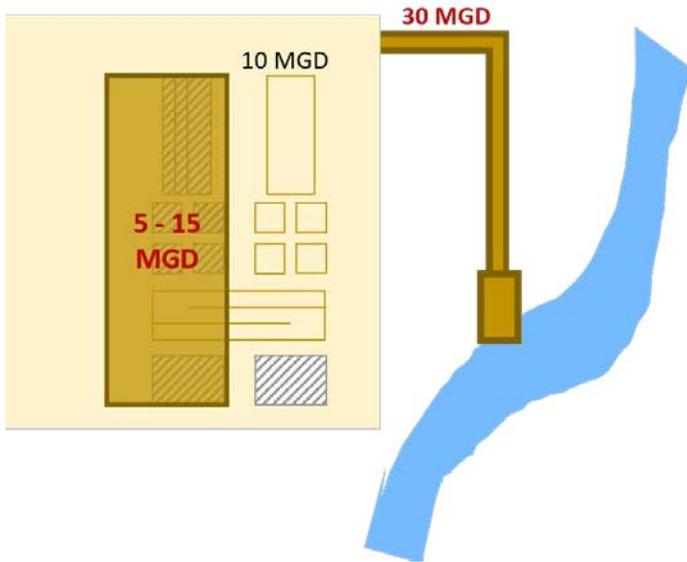
- Replace intake (seismically resilient).
- Expand Taylor to 30 mgd:



Alternative 7 – Develop New Resilient Supplies

Rock Creek and Taylor WTPs

- Continue with current treatment scheme at Taylor and Rock Creek.
- Repair & Replace as needed.
- Rock Creek WTP ages out of operation over the 50-year planning period.
- Replace Taylor intake (seismically resilient).



Develop New Resilient Supply – probably one of the following options

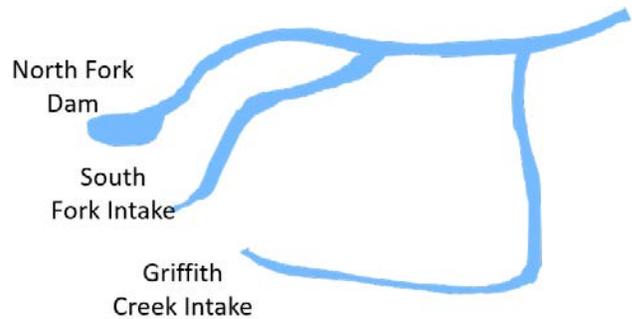
- Groundwater
- Aquifer storage and recovery
- Indirect potable reuse
- Direct potable reuse



Alternative 8 – Construct New WTP on the Willamette -- Removed from consideration, DOES NOT MEET REDUNDANT SUPPLY GOAL.

Rock Creek and Taylor WTPs

- Continue with current treatment scheme at Taylor and Rock Creek.
- Repair & Replace as needed.
- Rock Creek WTP ages out of operation over the 50-year planning period.
- Replace Taylor intake (seismically resilient).



New Willamette WTP

- Construct a seismically resilient 20 – 30 mgd Water Treatment Plant.

