OREGON WATER RESOURCES DEPARTMENT

WATER PROJECT GRANTS AND LOANS

GRANT APPLICATION

I. Project Information

Project Name: Smith Rock- King Way Irrigation Modernization & Conservation Project

Project Type: ☒ Conservation ☐ Reuse ☒ Flow Restoration and Protection
☐ Above-Ground Storage ☐ Below-Ground Storage
☒ Water Infrastructure ☐ Other: _____

Grant Funding Requested (must be no more than 75% of Total Cost of Project): $ 2,093,081

Match Funding (must be no less than 25% of Total Project Cost): $ 2,103,975

Total Cost of Project: $ 4,406,365

II. Applicant Information

Applicant Name: Deschutes River Conservancy	
Address:	700 NW Hill Street, Suite 1
	Bend, OR 97703
Phone:	541-382-4077
Fax:	
Email:	natasha@deschutesriver.org

Co-Applicant Name: Central Oregon Irrigation District	
Address:	1055 SW Lake Ct.
	Redmond, OR 97756
Phone:	541-548-6047
Fax:	
Email:	bdavies@coid.org

Co-Applicant Name: North Unit Irrigation District	
Address:	2024 NW Beech St.
	Madras, OR 97741
Phone:	541-475-2895
Fax:	
Email:	jbailey@northunit.com

Principle Contact: Kate Fitzpatrick	
Address:	700 NW Hill Street, Suite 1
	Bend, OR 97703
Phone:	541-382-4077
Fax:	
Email:	kate@deschutesriver.org

Fiscal Officer: Tara MacMillan	
Address:	700 NW Hill Street, Suite 1
	Bend, OR 97703
Phone:	541-382-4077
Fax:	
Email:	tara@deschutesriver.org

Certification: I certify that this application is a true and accurate representation of the proposed work and that I am authorized to sign as the Applicant or Co-Applicant. By the following signature, the Applicant and Co-Applicant (if applicable) certify that they are aware of the requirements of an Oregon Water Resources Department funding award, have read and are aware of conditions within the example grant agreement on the Department's website and are prepared to implement the project, if awarded.

Signature of Applicant/Authorized Person: Kate Fitzpatrick Date: 4/28/21

Print Name: Kate Fitzpatrick Title: Executive Director

Signature of Co-Applicant/Authorized Person: _____ Date: 4.28.21

Print Name: Craig Horrell Title: Manager

Signature of Co-Applicant/Authorized Person: Joshua J. Bailey Date: 4/28/21

Print Name: Josh Bailey Title: Manager

III. Eligibility

Select applicant entity type for both applicant and co-applicant (if applicable).

☐	City		☐	Oregon County
☐	Port		☒	Irrigation District
☐	Drainage District		☐	Water Improvement District
☐	Water Control District		☒	Non-Profit Organization
☐	Soil and Water Conservation District		☐	Corporation
☐	Partnership		☐	Sole Proprietorship
☐	Cooperative		☐	Indian tribe
☐	State of Oregon Agency		☐	Individual
☐	Federal Agency		☐	Other:

To be eligible for funding a project must address an instream and/or out-of-stream water supply need and result in project implementation. Does the project address an instream and/or out-of-stream water supply need and result in project implementation? ☒Yes ☐No

Provide a brief, one to two paragraph description of the water supply need that the project intends to address. Please reference (and attach) supporting data or reports that document the need.

The Smith Rock-King Way Irrigation Modernization and Conservation Project (Project) will help address both agricultural and environmental water supply needs in the Upper Deschutes Basin. These needs are best articulated in the recently completed Upper Deschutes Basin Study (see https://www.deschutesriver.org/news-and-resources/basin-study-documents), which assessed current and future water supply and demand in the Upper Deschutes River Basin and prioritized a range of potential strategies—including piping laterals—to address current and projected imbalances. The study identified that median shortages associated with meeting instream water rights and existing irrigation demands are approximately 130,000 AF, ranging up to 300,000 AF in dry years. To meet Endangered Species Act needs for the Oregon spotted frog and steelhead as required by the recently approved Deschutes Basin Habitat Conservation Plan (HCP, see https://www.fws.gov/oregonfwo/documents/DeschutesHCP/finalHCP/DBHCP%20Volume%201%20December%202020.pdf), median shortages are approximately 200,000 AF, ranging up to 400,000 AF in dry years.

Specifically, this Project intends to help balance water needs by providing more reliable water to a junior irrigation district within the Deschutes Basin while also helping to meet instream flow needs in

signature, the Applicant and Co-Applicant (if applicable) certify that they are aware of the requirements of an Oregon Water Resources Department funding award, have read and are aware of conditions within the example grant agreement on the Department's website and are prepared to implement the project, if awarded.

Signature of Applicant/Authorized Person: _____ Date: _____

Print Name: Kate Fitzpatrick Title: Executive Director

Signature of Co-Applicant/Authorized Person: _____ Date: _____

Print Name: Craig Horrell Title: Manager

Signature of Co-Applicant/Authorized Person: _____ Date: _____

Print Name: Josh Bailey Title: Manager

III. Eligibility

Select applicant entity type for both applicant and co-applicant (if applicable).

☐	City		☐	Oregon County
☐	Port		☒	Irrigation District
☐	Drainage District		☐	Water Improvement District
☐	Water Control District		☒	Non-Profit Organization
☐	Soil and Water Conservation District		☐	Corporation
☐	Partnership		☐	Sole Proprietorship
☐	Cooperative		☐	Indian tribe
☐	State of Oregon Agency		☐	Individual
☐	Federal Agency		☐	Other:

To be eligible for funding a project must address an instream and/or out-of-stream water supply need and result in project implementation. Does the project address an instream and/or out-of-stream water supply need and result in project implementation? ☒Yes ☐No

Provide a brief, one to two paragraph description of the water supply need that the project intends to address. Please reference (and attach) supporting data or reports that document the need.

The Smith Rock-King Way Irrigation Modernization and Conservation Project (Project) will help address both agricultural and environmental water supply needs in the Upper Deschutes Basin. These needs are best articulated in the recently completed Upper Deschutes Basin Study (see https://www.deschutesriver.org/news-and-resources/basin-study-documents), which assessed current and future water supply and demand in the Upper Deschutes River Basin and prioritized a range of potential strategies—including piping laterals—to address current and projected imbalances. The study identified that median shortages associated with meeting instream water rights and existing irrigation demands are approximately 130,000 AF, ranging up to 300,000 AF in dry years. To meet Endangered Species Act needs for the Oregon spotted frog and steelhead as required by the recently approved Deschutes Basin Habitat Conservation Plan (HCP, see

https://www.fws.gov/oregonfwo/documents/DeschutesHCP/finalHCP/DBHCP%20Volume%201%20December%202020.pdf), median shortages are approximately 200,000 AF, ranging up to 400,000 AF in dry years.

Specifically, this Project intends to help balance water needs by providing more reliable water to a junior irrigation district within the Deschutes Basin while also helping to meet instream flow needs in the Upper Deschutes River. The flow alteration in the Upper Deschutes River is largely due to the storage and diversion of irrigation water in Wickiup Reservoir (200,000 acre-feet). North Unit Irrigation District (NUID) holds the water rights to this stored water and is heavily reliant on it as the junior irrigation district in the system (1913 priority date). Irrigation practices in the district are relatively efficient based on the necessity of employing conservation practices to utilize junior water rights as effectively as possible. Opportunities to restore flow in the Upper Deschutes River rely on NUID reducing its demand for stored water by increasing its access to more senior natural flow rights from the Deschutes River. NUID is working with Central Oregon Irrigation District (COID) to solve this. COID holds senior live flow rights from the Deschutes River (1900/1907). A broad coalition of stakeholders in the Deschutes Basin is focused on and supportive of incentivizing water conservation in COID to increase the availability of natural flow to NUID, in exchange for increased outflow from Wickiup Reservoir and flow restoration in the Upper Deschutes River.

Is either the Applicant or Co-Applicant required to have a Water Management and Conservation Plan? ☒Yes ☐No

If yes, has the plan been submitted to the Water Resources Department and received approval? ☒Yes ☐No

Note: Pursuant to ORS 541.659 if an applicant is required to have a water management and conservation plan, the plan must be submitted to the Water Resources Department and receive approval prior to department acceptance of an application for a loan or grant from the account.

IV. Project Summary

Provide a brief, 4-5 sentence summary of the proposed project. This summary should include a brief description of the goal and scope of the project as well as summarize project implementation (i.e., planned infrastructure or activity). Please refer to the Water Project Grants and Loans Application Instructions for additional information on what to include in your project summary.

The Smith Rock-King Way Modernization and Conservation Project (Project) proposes to pipe 7,593 linear feet of Central Oregon Irrigation District's (COID) J lateral and all 15,548 linear feet of its L lateral. Collectively these laterals serve 2,194 irrigated acres in the Smith Rock-King Way area of COID in Deschutes County and connect to COID's Pilot Butte Canal, a primary conveyance system within COID, which will be piped beginning in fall 2021 as a part of COID's Watershed Plan with Natural Resources Conservation Service (see Watershed Plan website in references). The Project will expedite the benefits of on-demand pressurized water to COID patrons and enable water savings to be moved to other uses within the

Deschutes Basin to help meet critical basin water supply needs for agriculture and for streamflow in the Upper Deschutes River. Specifically, COID will transfer 100% of water conserved through this Project (estimated at 2 cfs/753 AF per COID's System Improvement Plan, see seepage loss measurements in Attachment 4) to North Unit Irrigation District (NUID) to improve the junior district's water right reliability. In exchange, NUID will legally protect 2 cfs in the Upper Deschutes River via a winter instream lease of its storage right in Wickiup Reservoir, enhancing instream flows for the ESA-listed Oregon spotted frog (see website for HCP in references).

V. Project Location

Instructions: Please answer the following questions about the location of the proposed project.

1. Please provide the following information about the project location.
    a. Latitude/Longitude (in decimal degrees): 44.337970352/121.065319997
    b. County: Deschutes & Crook
    c. Watershed/Basin: 1707030511

2. Please attach and label, Attachment #1, a site plan map showing the following (✓ when complete):
    a. ☒ Project area boundaries
    b. ☒ True north arrow
    c. ☒ Map title and legend
    d. ☒ Latitude and longitude of project location
    e. ☒ Property boundaries
    f. ☒ Tax Map and Lot numbers of each property in project area boundary and listed in Question #3. Use the same Tax Lot No. on the map as is used in Question #3.
    g. ☒ Surface water bodies
    h. ☒ Location of involved structures (existing or proposed)
    i. ☒ Point of Diversion and Place of Use associated with the project (if applicable)
    j. ☒ Proposed measurement locations (if applicable)

3. In the table below, identify any properties which project implementation impacts, indicate the types of activities that would occur on that site, and include a landowner agreement form and map for each property. *Add rows as needed.*

For many of the properties listed below, the 'landowner agreement form' is not checked. COID did not obtain landowner agreement forms as it has legal authority to implement the Project as described in Attachment 10. COID did provide notice to patrons of the Project, this application and that all monitoring information is a matter of public record. Please see Attachment 9 for COID patron notice information.

Tax Map No. (e.g. 12S06W-12714)	**Tax Lot No.** (e.g. 100)	**Ownership Type (✓ One)**	**Property Owner of Record**	**What type of activity occurs on this site as part of project implementation? (✓ all that apply)**	**If applicable, identify the type and extent of ground disturbing activity (e.g. test pits, borings, new road construction, excavation, etc.).**	**Landowner Agreement Form Attached (✓ when complete)**
14S13E-141315	500	☐Public ☒Private	Matthew William Lisignoli, Kendra Lynn Lisignoli	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact:	COID will reroute its lateral through this property for a more efficient pipe alignment. This work is outside of COID's Right of Way pursuant to the Carey Act. Please see attached landowner agreement form.	☒
14S13E-141315	501	☐Public ☒Private	Matthew William Lisignoli	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: Excavate a trench for water pipe install	COID will reroute its lateral through this property for a more efficient pipe alignment. This work is outside of COID's Right of Way pursuant to the Carey Act. Please see attached landowner agreement form.	☒
14S13E-141314C	700	☐Public ☒Private	Jeanene Bucaria, Trustee	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐

14S13E-141314C	800	☐Public ☒Private	FISCHER, SANDRA KAY ET AL	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141314C	400	☐Public ☒Private	GERALDINE EMERSON REV LIVING TRUST	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141314C	900	☐Public ☒Private	ABBAS, IKE R L ETAL	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141314C	300	☐Public ☒Private	Bryan T Scholz	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐

14S13E-141314C	200	☐Public ☒Private	Mary Sue Rigdon	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141314C	1000	☐Public ☒Private	Audrey K Cook & Ike R. L. Abbas	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141314C	1200	☐Public ☒Private	Donnie R & Makinah Dunn	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141314C	1600	☐Public ☒Private	Brian & Heather O'Neal	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐

14S13E-141314C	1300	☐Public ☒Private	Anthony Vincent Jeter	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141314C	1500	☐Public ☒Private	Nicholas C Haring	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141314C	1400	☐Public ☒Private	Nancy Alderson	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141314C	100	☐Public ☒Private	Richard D & Kristin M Gilmore	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐

13S13E-141314D	100	☐Public ☒Private	Luis Elenes	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141324	200	☐Public ☒Private	CLAIRE M LAURANCE OREGON TRUST	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141324	100	☐Public ☒Private	Linda Stream	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S13E-141313	1800	☐Public ☒Private	EILEEN E BELCHER TRUST	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐

14S14E-141418	402	☐Public ☒Private	William R and Karen L Wilson	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S14E 141418	400	☐Public ☒Private	Mack Ginger McFarland	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S14E-141418	401	☐Public ☒Private	Thomas J Warner and Mary Wilda	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S14E-141418	504	☐Public ☒Private	Lone Pine LLC	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐

14S14E-141419	200	☐Public ☒Private	Jason M Johnson	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S14E-141419	202	☐Public ☒Private	D'Ann K Nash	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S14E-141419	201	☐Public ☒Private	Carl E and Cynthia Hemphill	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S14E-141419	100	☐Public ☒Private	Hannah Eve Schlesinger	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐

14S14E-141418	502	☐Public ☒Private	Gretchen Brooks & Rebecca Julian Trust	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S14E-141418	500	☐Public ☒Private	Gretchen Brooks & Rebecca Julian Trust	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S14E-141418	600	☐Public ☒Private	John and Angela Brooks	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐
14S14E-141419	600	☐Public ☒Private	Crook County	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐

14S14E-141420	101	☐Public ☒Private	David Butler	☒ Access site ☒ Project work ☒Ground disturbing activity ☐Other impact: _____	COID will access and perform project tasks on this property pursuant to its Right of Way under the Carey Act. Please see the attached letter from COID's attorney describing this authority and map identifying properties subject to this authority.	☐

4. For **each** property listed in Question #3, attach a Landowner Agreement Form. Attach Landowner Agreement form(s) and label Attachment #2.
    a. Where a single landowner entity is the owner of record for multiple properties, one form may list the multiple properties owned by that entity.
    b. For *public* lands attach the landowner form or other documented authorization from the federal or state government property owner allowing project implementation **or** documentation that demonstrates such authorization is being pursued.

VI. Project Specifics

Instructions: Please answer the following questions.

Project Description, Needs, and Goals

5. Provide additional information (building on the project summary) to further describe the proposed project and the project goal.

Purpose and nature of the project: The purpose of the Project is to pipe 23,141 linear feet of lateral canals within the Central Oregon Irrigation District. The Project will conserve an estimated 2 cfs (753 AF) of water that will be moved to meet other uses in the Deschutes Basin.

The Project, while seemingly small when measured against the water shortages in the Deschutes Basin, is an important piece of a broader basin-wide effort to balance water needs across uses in the Deschutes Basin in Central Oregon. The Deschutes Basin faces water shortages on the scale of 300,000 acre-feet (in dry years) to meet agricultural, community and river needs due to the overallocation of water, increasing drought, and climate change. Unmet streamflow needs in the rivers have created critical habitat issues for fish and wildlife, which will necessitate streamflow restoration to meet needs for species listed under the Endangered Species Act, particularly the Oregon spotted frog. The imperative to allocate flow from irrigation uses to rivers under the recently completed Deschutes Basin Habitat Conservation Plan (see HCP) creates intense risk for farmers in North Unit Irrigation District (NUID) in Jefferson County, a district with an already-

unreliable, junior water supply. A diverse and rural population in Jefferson County (40% non-white) depends on that agricultural economy and subsequent years of severe drought is endangering individual farms and the collective farm economy.

Basin partners have collaborated for decades to implement projects that improve water supply, support agriculture and restore streamflows in the Deschutes Basin. Recent efforts include the Upper Deschutes River Basin Study (see Basin Study), which was completed in 2019 and co-managed (with Bureau of Reclamation) by a group of 42 diverse stakeholders. The Basin Study refined supply and demand numbers, modeled water shortages in different hydrologic years and identified water management strategies to restore flows in the basin while meeting agricultural and municipal needs. It provided state of the art modeling for several water management scenarios, providing information on how different tools could work together. The Basin Study evaluated a variety of water supply options, but it focused on the following three main options:

Water Conservation (Irrigation) – The water conservation option considered specific tools related to agricultural demands, including piping district canals, piping privately owned laterals, and on-farm infrastructure upgrades (e.g., flood-to-sprinkler shifts in irrigation). Water conservation can decrease irrigation demand in particular areas, making water available to meet other water needs in the basin and possibly increasing water security for other users.

• **Market-Based Approaches** – The market-based option considered the use of price incentives to promote efficient water use and reallocation of supply. Tools relevant to agricultural uses include temporary lease of water rights (fallowing acres on an annual basis), voluntary duty reduction (incentives to reduce water use per acre), and permanent sale of water rights (moving irrigation water rights permanently off acres). Market-based approaches can also decrease irrigation demand in one area, making water available to meet other needs in the basin and possibly increasing water security for other users. For example, market transactions can be used to move water from one irrigator to another irrigator or instream.

• **Relocated Storage** – Relocated storage facilities could potentially support improved streamflows by relocating existing storage in the mainstem Deschutes River system (for example, from Wickiup closer to NUID) to provide additional flexibility in water operations.

Reclamation recently finalized the Upper Deschutes River Basin Study Report, which provides the foundation of information needed to draft a comprehensive basin management plan. While the Basin Study generated the information necessary to forge broadly supported water supply options, Basin Studies are not intended to culminate in an implementation plan. Basin stakeholders were eager to stay together to continue planning and to and accelerate implementation of projects. This led to the formation of the Deschutes Basin Water Collaborative (DBWC) in 2020, in part to develop a comprehensive water management plan for the Upper Deschutes Sub-basin.

The DBWC has 43 diverse members, a signed charter and established decision-making processes. It will build on previous planning efforts and the extensive information generated in the Deschutes Water Planning Initiative (predecessor collaborative to the Basin Study) and the Upper Deschutes River Basin Study, to develop a comprehensive regional water management plan that guides the implementation of water projects to meet

needs for rivers, agriculture and growing communities. This plan will provide a roadmap to meet long-term needs in the Deschutes and will give the basin a powerful platform to ensure implementation results have as much benefit as possible to the resource and to communities. It can also help secure funding needed for implementation and to address barriers to implementation. The group will complete an analysis to prioritize issues within the restoration plan. The group is very focused on accelerating implementation of projects and will develop a prioritized list of projects as well as priority issues that may need to be resolved. The group has already identified two major priority issues- how to restore streamflows in the Upper Deschutes River while supporting agriculture, and how to generate groundwater mitigation credits for growing municipalities.

While the DBWC moves through the planning process, basin partners continue to leverage federal funding opportunities to advance water supply options identified in the Basin Study to meet aggressive flow targets required under the HCP, specifically water conservation through piping, on-farm infrastructure upgrades and the development of a water marketing strategy. Deschutes Basin irrigation districts have secured significant funding to pipe district main canals—which have seepage losses of approximately 50%--through Natural Resources Conservation Services' (NRCS) Watershed Protection and Flood Prevention Program (see Watershed Plan). A complementary investment in adjacent laterals, sublaterals and on-farm efficiency infrastructure is necessary to close the loop and create an on-demand pressurized system that optimizes conservation and doubles water savings. To help advance this work, DRC, COID, and the Deschutes County Soil and Water Conservation District recently received a NRCS Regional Conservation Partnership Program grant to provide match for this Project as well as the implementation of on-farm irrigation efficiency projects on land adjacent to this project. On-farm irrigation efficiency projects will be prioritized using a spatial tool built by the DRC and COID as part of a recently submitted OWRD feasibility study grant.

Intended process and outcomes: This Project focuses on piping two of COID's laterals in the Smith Rock-King Way area. COID prioritized these laterals for piping because of their 1) adjacency to COID's Pilot Butte Canal, which will be piped beginning in 2021, and hence will have the ability to capture gravitational pressure earlier than other laterals, 2) high water loss, and 3) ability to translate the water conserved from this project to increased reliability for NUID farmers and enhanced streamflows in the Upper Deschutes River. Other outcomes include: 1) energy savings to landowners that are able to eliminate pumping, 2) increased irrigation efficiency as patrons transition from flood irrigation to efficient pressurized irrigation systems, 3) improved public safety from the elimination of drowning hazards (see Q 18(a)), and 4) reduced operations and maintenance costs for COID (see Q 16(c)).

Design and construction of the Project will follow industry standards. The applicants, co-applicants and consultants have successfully implemented many canal piping projects over the last 25 years. Key tasks, enumerated in Q 9, outline implementation of this Project in greater detail.

The process for the instream protection of the water savings resulting from this Project, however, is innovative and does not follow the traditional path of protecting conserved water through the Allocation of Conserved Water statute. Basin partners have been working with OWRD staff over the past several years to chart a process that both complies with its existing statutory authority and administrative rules and meets the specific needs of the Deschutes Basin as articulated in the HCP and Upper Deschutes Basin Study. Specifically, this process involves reducing water demand through the implementation of conservation projects in COID—a senior irrigation district—then passing this water via a shared conveyance system to NUID—a junior irrigation district—for consumptive use by NUID in exchange for NUID releasing an equivalent amount of stored water from Wickiup Reservoir in the winter to help meet HCP instream flow targets for the Oregon spotted frog.

Stored water released under this pathway will be protected through an OWRD instream lease under ORS 537.348(2) and OAR 690-077 and retain the same priority date as the originating water right certificate. Oregon law does not currently provide for a pathway to permanently protect the storage water instream. While Oregon statute authorizes OWRD to approve permanent instream transfers of storage water rights (ORS 537.348), OWRD believes its administrative rules need further calrification to allow for approval of these permanent transfers. OWRD recently announced it will convene a Rules Advisory Committee in spring 2021 to address this issue. In addition, the Department of Justice recently concluded that OWRD did not have authority to approve changes in the character of use of stored water to include, inter alia, instream flows. Authority for this pathway is currently being pursued in the 2021 legislative session via HB 3103 and HB 3091. To ensure permanent protection of the stored water proposed for protection in this Project, absent rule clarification or authorizing legislation, Applicants and Co-Applicants propose to enter into an agreement specifying the instream lease would be renewed in perpetuity or until the State of Oregon provided the clarity needed for a permanent change. This agreement would be submitted as part of the lease and attached as part of the final order.

Instream lease 1770 and CW-102 (see Attachment 8) provide examples of the proposed approach. Note the Memorandum of Agreement to Perpetually Lease Water to Instream Use, attached to CW-102 which explicitly provides for the perpetual leasing of water until a permanent pathway exists:

"[p]rior to the expiration of the lease, NUID shall apply to OWRD to renew the lease for an additional five-year term, and shall do so perpetually until such time as the statutes and rules are updated regarding reservoir storage rights. At such time that the statutes and rules are updated regarding reservoir storage rights, NUID shall coordinate with OWRD to have the leased water…incorporated into a permanent instream water right." (CW-102, p 20).

While this Project will not use the Conserved Water Statutes to allocate instream flow, Applicants and Co-Applicants propose to use this approach to ensure the permanent instream protection of conserved water from Wickiup Reservoir as proposed in this Project.

Pursuant to OAR 690-077-0076(2)(b), the owner of any storage facility which is the source of water for a lease must be a co-lessor. The Bureau of Reclamation is the storage facility owner of Wickiup Reservoir, the source of water proposed to be leased in this Project and must consent and agree to the lease application. NUID's revised contract with the Bureau provides for such consent (see Attachment 7: NUID/BOR Contract, p.5) and following the example set in IL-1770 may indicate such consent with an email to OWRD. (see Attachment 8, p. 1)

6. Provide a summary of evidence to demonstrate project feasibility. This summary may include the results of a feasibility study. Attach the results of the study or other evidence, as necessary to support the summary.

Preliminary plans and specification. COID operates and maintains over 400 miles of primarily open-earth canals that collectively deliver water to approximately 42,413 acres of productive land. The volcanic nature of the Central Oregon geology results in the propensity for significant seepage losses (ranging up to 50%) in many areas of the COID canal system. Piping is a proven approach to mitigate this loss and secure reliable, long-term water supply. Improving irrigation infrastructure with Central Oregon irrigation districts successfully restored 130 cfs in the Upper Deschutes River basin from 2004-2017. (Deschutes River Conservancy 2018).

In 2016 and 2017, COID completed a System Improvement Plan to develop a well-considered evaluation of the District's primary and secondary (i.e. main canals and primary laterals convey flow rates as low as 5 CFS peak flow) canal systems, a mitigation plan for the seepage losses, and consideration of resulting pressurized deliveries. System piping was the primary method proposed for such mitigation.

In 2016 Black Rock Consulting worked with the District to coordinate a seepage loss study performed by District staff under Black Rock Consulting, Inc. (Kevin L. Crew, P.E.)

direction. This study measured seepage loss on the J canal at 4.76 cfs. (see Attachment 4). COID staff performed additional seepage loss measurements on the J canal in 2017 (see Attachment 4) and measured 3.63 cfs of loss. Subsequent partial piping of the J lateral resulted in 3.1 cfs of water conservation. Using the seepage loss measurements from 2017 to provide a conservative estimate, the portion of the J lateral proposed for piping in this Project is estimated to result in .5 cfs of water conservation. L lateral seepage losses were also measured in 2016 under the direction of Black Rock Consulting, Inc., revealing a loss of 2.26 cfs. The data collected, however, yielded some variable results so Black Rock, Inc. recommended an additional loss study for the L lateral. COID staff will perform another loss study on the L lateral in irrigation season 2022 to help inform a better estaimte. For purposes of this application, the Applicants and Co-Applicants offer a conservative estimate of 1.5cfs of seepage loss on the L lateral. More loss measurements will improve confidence in this estimate. Additionally, COID will confirm losses/savings post project implementation via measurements (see Q 9). The instream lease volume will reflect these confirmed numbers.

Feasibility of securing permits
Physical and regulatory availability of the water
With 1900 and 1907 primary water right certificates for live flow from the Deschutes River, COID is considered a senior water right holder in the Deschutes Basin. In addition, COID has a storage water right in Crane Prairie for use as a supplemental water supply. In an average year, COID's primary water right is 98% reliable. Given the reliability of COID's water right, water to operate this Project is available in all years.

The Applicants propose to protect water conserved from this Project instream via a unique but tested regulatory pathway developed specifically to balance water needs in the Deschutes Basin. The process for the instream protection of the water savings resulting from this Project does not follow the traditional path of protecting conserved water through the Allocation of Conserved Water statute. Using this traditional pathway would not produce the highest priority environmental outcomes contemplated by this Project; namely to secure more winter instream flow in the Upper Deschutes River for the Oregon spotted frog (see HCP, website provided above).

Basin partners have been working with OWRD staff over the past several years to chart a process that both complies with its existing statutory authority and administrative rules and meets the specific needs of the Deschutes Basin as articulated in the HCP and Upper Deschutes Basin Study. Specifically, this process involves reducing water demand through the implementation of conservation projects in COID—a senior irrigation district—then passing this water via a shared conveyance system to NUID—a junior irrigation district—for consumptive use by NUID in exchange for NUID releasing an equivalent amount of stored water from Wickiup Reservoir in the winter to help meet HCP instream flow targets for the Oregon spotted frog.

Stored water released under this pathway will be protected through an OWRD instream lease under ORS 537.348(2) and OAR 690-077 and retain the same priority date as the originating water right certificate. Oregon law does not currently provide for a pathway to

permanently protect the storage water instream. While Oregon statute authorizes OWRD to approve permanent instream transfers of storage water rights (ORS 537.348), OWRD believes its administrative rules need further clarification to allow for approval of these permanent transfers. OWRD recently announced it will convene a Rules Advisory Committee in spring 2021 to address this issue. In addition, the Department of Justice recently concluded that OWRD did not have authority to approve changes in the character of use of stored water to include, inter alia, instream flows. Authority for this pathway is currently being pursued in the 2021 legislative session via HB 3103 and HB 3091. To ensure permanent protection of the stored water proposed for protection in this Project, absent rule clarification or authorizing legislation, Applicants and Co-Applicants propose to enter into an agreement specifying the instream lease would be renewed in perpetuity or until the State of Oregon provided the clarity needed for a permanent change.

Instream lease 1770 and CW-102 (see Attachment 8) provide examples of the proposed approach. Note the Memorandum of Agreement to Perpetually Lease Water to Instream Use, attached to CW-102 which explicitly provides for the perpetual leasing of water until a permanent pathway exists:

"[p]rior to the expiration of the lease, NUID shall apply to OWRD to renew the lease for an additional five-year term, and shall do so perpetually until such time as the statutes and rules are updated regarding reservoir storage rights. At such time that the statutes and rules are updated regarding reservoir storage rights, NUID shall coordinate with OWRD to have the leased water…incorporated into a permanent instream water right." (CW-102, p 20).

While this Project will not use the Conserved Water Statutes to allocate instream flow, Applicants and Co-Applicants propose to use this approach to ensure the permanent instream protection of conserved water from Wickiup Reservoir as proposed in this Project.

Pursuant to OAR 690-077-0076(2)(b), the owner of any storage facility which is the source of water for a lease must be a co-lessor. The Bureau of Reclamation is the storage facility owner of Wickiup Reservoir, the source of water proposed to be leased in this Project and must consent and agree to the lease application. NUID's revised contract with the Bureau provides for such consent (see Attachment 7: NUID/BOR Contract, p. 5) and following the example set in IL-1770 may indicate such consent with an email to OWRD. (see Attachment 8, p. 1)

7. Describe partnerships and collaborative efforts associated with the planning or implementation of this project. Include a description of how parties of diverse interests worked, or will work together to achieve a common goal.

Partnerships and collaborative efforts associated with basin-wide goals supported by this project:
Stakeholders have a long history of collaborative success developing and implementing projects and programs to meet instream and out-of-stream water needs in the Deschutes

Basin. Over the past 25 years, partners have restored over 200 cfs instream in key reaches like Whychus Creek, the Middle Deschutes River, Tumalo Creek, and the Crooked River while increasing the reliability of irrigation rights.

There is a high level of community support generally for water conservation in the Deschutes Basin, illustrated by the high level of participation and involvement in the Upper Deschutes Basin Study and Deschutes Basin Water Collaborative.

Basin partners recently completed the Upper Deschutes River Basin Study in partnership with the Bureau of Reclamation and the Oregon Water Resources Department. The purpose of the Basin Study was to assess current and future water supply and demand in the Upper Deschutes River basin and to identify a range of potential strategies to address current and projected imbalances. The Basin Study was co-managed by the Bureau of Reclamation and the Basin Study Work Group, a group of forty diverse stakeholders, including the Applicants and Co-Applicants to this proposal. Based on identified water supply shortages, the Basin Study examined potential water management options that could help meet future needs in the basin. Desired outcomes for the Basin Study were to identify and evaluate options for addressing low and altered streamflows to benefit ecological conditions while maintaining or improving water supply reliability and/or financial security for irrigated agriculture, and while planning to meet future groundwater mitigation needs for municipal, industrial, and commercial uses.

One option the Basin Study examined to help balance water supply needs in the basin was water conservation. The water conservation option considered specific tools related to agricultural demands, including piping district canals, piping privately owned laterals, and on-farm infrastructure upgrades (e.g., flood-to-sprinkler shifts in irrigation). The Study found that water conservation can decrease irrigation demand in particular areas, making water available to meet other water needs in the basin, including increasing water security for other users and enhancing streamflows for aquatic habitat.

Other benefits associated with water conservation infrastructure improvements include the following:
• enables better management of water and irrigation conveyance operations.
• does not affect the number or locations of irrigated acres.
• increases opportunities for other tools such as water marketing.

While the Basin Study generated the information necessary to forge board support for strategies to address imbalances in water supply and demand in the Deschutes Basin, per Bureau of Reclamation direction, the Study did not culminate in an implementation plan. Basin stakeholders were eager to stay together to integrate the strategies identified in the Basin Study into a comprehensive water management plan for the Upper Deschutes Basin and support the implementation of slated projects that met broad basin-wide goals. This led to the formation of the Deschutes Basin Water Collaborative (DBWC) in 2020, with 43 diverse members, a signed charter and established decision-making processes.

The DBWC is currently developing a comprehensive regional water management plan that guides the implementation of water projects to meet needs for rivers, agriculture and

growing communities. This plan will provide a roadmap to meet long-term needs in the Deschutes and will give the basin a powerful platform to ensure implementation results have as much benefit as possible to the resource and to communities. It will also help secure funding needed for implementation and to address barriers to implementation. DBWC members also keep each other informed and seek individual member support of water conservation projects currently being implemented under the irrigation districts' NRCS Watershed Plans to meet HCP requirements.

Partnerships and collaborative efforts associated with the specific implementation of this project: The DRC and COID have a long history of working together to balance water needs in the Deschutes Basin. COID participates annually in DRC's Annual Water Leasing Program and COID's manager sits on the DRC board of directors. Both organizations are members of the Deschutes Basin Water Collaborative.

Recently, COID and DRC have been working together to develop and fund an on-farm program to provide information, technical assistance and financial resources to COID patrons to improve management of private laterals and promote on-farm irrigation efficiency (On-farm Program or Program). The long-term goal of the On-farm Program is to further reduce on-farm water needs throughout COID to help meet environmental, municipal and other irrigation water demands in the Deschutes Basin. This Program will leverage the benefits of the main canal piping being implemented under COID's Watershed Plan. COID recently capitalized the Program by making an initial investment of $100,000 and establishing a low-interest loan program for patrons to incentivize the implementation of on-farm projects within the district. DRC is providing strategic, development and implementation support for the Program.

In April 2021, DRC and COID were recommended for funding for a feasibility study grant with Oregon Water Resources Department to develop a Prioritization Toolbox that consists of an integrated set of spatial, spreadsheet/database, and potentially remote-sensing-based elements that will help identify the greatest and most cost-effective opportunity areas for conservation projects within COID's laterals and on-farm acreage and assist in measuring and tracking water savings so they can be mobilized to solve basin water supply issues. This work ties directly to the water marketing strategy DRC and COID are developing as part of a Bureau of Reclamation WaterSMART grant. The water marketing strategy focuses on incentivizing water users to use less water at the farm level, and then moving that water between irrigation districts to increase the availability of live flow for junior users while providing assurances for the restoration and protection of flows in the Upper Deschutes River for the ESA-listed Oregon spotted frog.

To further support the On-Farm Program, DRC, COID and the Deschutes County Soil and Water Conservation District recently received a Regional Conservation Partnership Program grant that employs most of the strategies developed as part of the Basin Study—district canal piping, private lateral piping, on-farm efficiencies, and water marketing—to save water in COID which will be redirected to NUID in exchange for using stored water from Wickiup Reservoir to manage flows in the Upper Deschutes to benefit the river and aquatic species. Specifically, partners will build off of COID's recently authorized

Watershed Plan, and the resulting piping of the District's Pilot Butte Canal, to continue piping the District's J and L laterals and sub-laterals while implementing on-farm efficiency upgrades in the same area.

Finally, the Co-Applicants have worked very hard over the last several years with federal and state agencies to develop a pathway to tie conservation projects in COID to restored streamflow in the Upper Deschutes River. See questions 5 and 6 for a more detailed explanation of this pathway.

8. List letters of support (name and/or affiliation of sender is sufficient). Attach copies of the letters to your application.

Robert Brunoe, Confederated Tribes of Warm Springs Reservation of Oregon
Mike Britton, North Unit Irrigation District
Shon Rae, Central Oregon Irrigation District
Mike Taylor, Wild River Owners Association

Project Tasks

9. Identify tasks necessary for the proposed project using the following format and including as many tasks as necessary to implement the project. In the event that your proposed project receives grant funding, the tasks identified will be incorporated into your grant agreement as the "Project Description."

   Note: Project management and administration are common functions within specified project tasks and not a separate project task. All cost match and grant budget funds must apply to the tasks identified below. See the Budget Procedures and Allowable Costs document for more.

   ### For each Task address the following:

   Task number. Key Task Title
   - Task schedule: The approximate dates during which the key task will be completed.
   - Description of key task activities: Include specific details of the task such as task purpose, planned approach, and proposed methods.
   - Permits/Regulatory Approvals Required: List any permits or regulatory approvals required to conduct the task. All permits/regulatory approvals identified must also be listed in question 15 of this application.

   Task 1. Design
   - Task schedule: Sept. 2021 – Dec. 2021
   - Description of key task activities: Research, specify requirements, feasibility, concept generation, preliminary and detailed design, production, planning and utility locate
   - Permits/Regulatory Approvals Required:

Task 2. Cultural Resource Survey

- Task schedule: Jan. 2022 – March 2022
- Description of key task activities: Identification and assessment of both archaeological resources within the tract and historic structures within and nearby the tract. Obtain SHPO permit with information from survey.
- Permits/Regulatory Approvals Required: Applicant and Co-Applicants will seek a State Historic Preservation Office permit following survey.

Task 3. L Lateral Loss Measurements

- Task schedule: April 2021 – October 2021
- Description of key task activities: Measure L Lateral while irrigation occurs to determine water losses along the canal. Compare with previous loss measurements.
- Permits/Regulatory Approvals Required:

Task 4. County Road Permitting

- Task schedule: March 2022 – June 2022
- Description of key task activities: Obtain permits from county for road and right-of-way related activities
- Permits/Regulatory Approvals Required: Oversized Load Moving Permit, Permit for Working in a Public Right-Of-Way

Task 5. Bid Solicitation and Contracting

- Task schedule: March 2022
- Description of key task activities: Develop solicitation document for construction contractor and material procurement. Publicly advertise and receive bids for contractor and material procurement. Select and award to contractors following Oregon Statutes for Public Contracting Code; Execute contracts with selected contractors. Arrangement of construction services while mitigating risk, ensuring timeliness and within financial parameters.
- Permits/Regulatory Approvals Required:

Task 6. Materials Procurement

- Task schedule: March 2022 – September 2022
- Description of key task activities: Acquiring materials for project within financial parameters, timeline, acceptable quality and mitigating risk.
- Permits/Regulatory Approvals Required:

Task 7. Construction

- Task schedule: Oct. 2022 – April 2023
- Description of key task activities: Excavation of existing canal for piping site, installation of pipe and associated fittings, restoration of disturbed roads and right-of-way areas.
- Permits/Regulatory Approvals Required:

Task 8. Contract with NUID

- Task schedule: January 2023
- Description of key task activities: Draft contract with NUID to protect storage water right instream, in perpetuity, in the Upper Deschutes in exchange for live flow conserved from this piping project.
- Permits/Regulatory Approvals Required:

Task 9. Verification of Water Savings

- Task schedule: April 2023 – October 2023
- Description of key task activities: Measure and document water savings throughout the 2023 irrigation season.
- Permits/Regulatory Approvals Required:

Task 10. Instream Lease

- Task schedule: September 2023
- Description of key task activities: Draft and file a 5-year instream lease application with the State of Oregon Water Resources Department for NUID's storage right.
- Permits/Regulatory Approvals Required: Oregon Water Resources Department Instream Lease

Copy and paste additional tasks as needed.

10. Project Task Scheduling – Estimated total project duration: 18 months (months/years)

    Place an "X" in the appropriate column to indicate when each Project Task would take place. Note that successful projects generally do not receive their first reimbursement until late Q1 or early Q2 of the year after application submission. Project tasks listed must match the tasks identified in Question 9.

Key Tasks (Add additional rows as needed)	Grant year 2021				Grant year 2022				Grant year 2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Design	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐
Cultural Resource Survey	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐
Lateral Loss Measurements	☐	☐	☐	☐	☐	☒	☒	☒	☐	☐	☐	☐
County Road Permitting	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐
Bid Solicitation and Contracting	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐
Materials Procurement	☐	☐	☐	☐	☐	☒	☒	☐	☐	☐	☐	☐
Construction	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒	☐	☐
Contract with NUID	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐
Verification of Water Savings	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☒	☒
Instream Lease	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐

11. Describe how you propose to measure and report the water diverted and used from the proposed project. Include a proposed method, timing, frequency, and location of measurement in your proposal. If you have questions please contact the Department for more information. Consider that many forms of measurement will incur additional costs.

    Note: Funded projects are required by statute to "regularly measure and report the water diverted and used from the project" [ORS 541.692(3)]." Common approaches for measuring water diverted and used include totalizing flow meters, stream gages, reservoir staff plates and water level sensors paired with volume-depth curves, and flumes. The Department makes the final determination on the method, timing, frequency, and location of measurement. This requirement applies if there is any diversion of water. Grant/loan funds can be used to pay for measurement and reporting expenses during the life of the grant.

The Project involves several points of measurements: 1) COID's point of diversion on the Deschutes River, 2) water delivery into the J and L laterals and to J and L lateral patrons, 3) water spill from COID to NUID canal, and 4) instream storage release from Wickiup Reservoir. Measurement at each of these points is outlined below:

1) The J and L Laterals are served via COID's Pilot Butte Canal which carries live flow from the Deschutes River diverted at North Canal Dam (RM 164.8). During peak irrigation season, the District may divert up to 509 cfs from this diversion, which has powered head gates and an agency compliant fish screen. Water diversion at the North Canal Dam is

measured via a stilling well. COID's rate at this point of diversion will not decrease as a result of this Project, as water conserved from the piping of the J and L Laterals will be spilled to NUID (see #3 below).

2) Water will be measured with mag-meters installed at the head of both the J-Lateral and L-Lateral and every patron delivery. In some instances, where applicable, a cipoletti weir will be used to double check the mag-meters. COID's ditch rider will measure water and adjust delivery rate as needed into each lateral and point of delivery, during his daily rounds from April 1st through October 31st.
3) COID spills water from the Pilot Butte Canal (PBC) into NUID's Main Canal approximately 3,000 feet upstream from the end of the PBC (near Smith Rock). The spill includes any additional water in the PBC system and 4 cfs from CW-81. Water at the spill is measured with a 15' cipoletti weir and stilling well and is named 'Central Oregon Spill Weir NR Terrebonne or OWRD Station ID 14069699. Spill water is reported to OWRD and credited to NUID. For the 4 cfs associated with CW-81, an equal volume of water is released as instream flow from Wickiup Reservoir during the winter.
4) Water released from Wickiup dam is measured a few hundred yards below the Wickiup Dam outlet by OWRD at Station ID 14056500 (Deschutes River Below Wickiup). The gaging station has a stilling well hydraulically connected to the river. A Waterlog H-500XL recorder logs stage and water temperature data every 15 minutes. Stage is monitored using a float-tape setup that is attached to an H-331 encoder. Water temperature is measured with a H-377 temperature probe; the probe is mounted in the river. Every hour, data from the H-500XL is radioed to a H-522+ logger at the Wickiup valve house. From there, the data is transmitted via satellite to the OWRD office in Salem and then to the Bureau of Reclamation's Hydromet system. About two measurements per month (at minimum) are required to track aquatic growth during the irrigation season (spring to fall) and die-off during the winter.

12. Provide suggestions for interim and long-term project performance benchmarks and how those benchmarks would be measured.

Interim project benchmarks could include:

- adherence to the timeline of the project (e.g. project start date, project end date, project release date for bidding, award of bid, end date of 100% engineering)
- passing weld tests
- scheduled project site visits to check quality of work performed.

The timeline and weld tests would be measured from an outlook as a pass or no-pass, while the site visits would be measured by the resolution of problems outlined from the previous project site visit.

Long-Term Benchmarks could include:

- application and final order of instream lease: this flow will be monitored at stream gauges by OWRD.
- monitoring the longevity of the pipe, fittings, meters, and structures vs the engineered estimates.
- number of patrons that switch from non-pressurized irrigation systems to pressurized irrigation systems throughout the project area will be documented, and measured as a percent, with the goal of reaching 100% participation.

13. Describe any issues, unknowns, or conditions that may affect the completion of the key tasks or project. If applicable, describe any measures planned to mitigate them.

Because water must be turned off to pipe, the installation of pipe is limited to a 6-month maintenance season. The maintenance season takes place between October and March and coincides with higher precipitation events that may slow construction. COID can mitigate this potential problem by shutting down in early October and, if necessary, starting the following irrigation season later in the spring, providing additional time to complete the project.

Another possible issue would be the unknown problems that may arise during construction. Scheduled construction site visits will be planned at a max of 3-week intervals or sooner as needed. A constructability review will be performed at every meeting to address problems and proposed changes to the design of the system. Attendees to this meeting will include the hired project manager, COID operations manager, hired project engineer, and COID's engineer.

Permits and Regulatory Approvals

14. Identify any water rights needed to implement the proposed project below. Check all of the following that apply and provide the information requested:

a. ☒ The proposed project requires a new water right or other water right transactions. If checked, list transaction(s) required (e.g., new right, transfer, etc.): Instream Lease. Please see IL-1770 (Attachment 8) as example.
b. ☒ The applicants holds the water right(s) required for the project. If checked, list all such water rights required for the project in the table below, adding rows as needed. See the Application Instructions for further instruction, including how to find water right information.
c. ☐ The applicant has legal access to a water right that will required for the project and has been given permission to utilize the water right(s). If checked, list all such water rights required for the project in the table below, adding rows as needed. See the Application Instructions for further guidance, including how to find water right information.

Water Right Number (Include prefixes, if applicable, e.g., G 00010)	Is this an application, permit, certificate, limited license, special or final order, transfer, decree, lease, or claim?	Water Right Amount			Tax Map/Lot IDs within the Place of Use where water will be used to implement the proposed project
		Max Volume (ac-ft)	Max Rate (cfs)	Duty (ac-ft/ac)	
94956	Certificate	409,485	1286.191	9.91	
72279	Certificate	252,866.14	1078.76	5.25	
51229	Certificate (primary)	200,000			

15. In the table below, provide a list of any permits and regulatory approvals needed to implement the project and indicate the status of each in the table below. Please submit copies of any secured permits/approvals or describe efforts in securing necessary permits/approvals, including current status. If no permits or regulatory approvals are required, please provide an explanation. *Add rows as needed.*

Permit/ Regulatory Approval	Status and Efforts To Date
County road permit(s)	Will inquire about permit(s) in Q1 2022 and apply for permit(s) in Q2 2022;
State Historic Preservation Office permit	Will apply in Q2 202 after completion of cultural resources survey.

VII. Public Benefits

Instructions: Describe how the project would provide public benefits in each of the three public benefit categories identified below. In your responses, describe current conditions and anticipated project outcomes and benefits and provide evidence to support your claims. Describe how the project outcomes will contribute to each anticipated public benefit. Descriptions should be quantitative when possible. Applications will be scored and ranked solely based on the descriptions of the economic, environmental, and social/cultural public benefits and the likelihood of the project achieving the claimed benefits. More specifically, the evaluation will be based on the change in conditions expected to result from the project as demonstrated in the application.

Please see the Scoring Criteria document available on the Applications, Forms and Guidance webpage, for definitions of each public benefit and a description of how the public benefits will be evaluated. Applications that do not demonstrate public benefit in each of the three categories (economic, environmental, social/cultural) will be deemed incomplete.

Leave blank any public benefits that are not applicable to the proposed project.

16. Economic Benefits – ORS 541.673(2)

    a. Does the project create or retain jobs? If so, explain.

The project may generate minimal, short-term construction job opportunities associated with piping. Typically, the demand for construction laborers decreases during the winter months as the ability to complete projects is hindered by inclement weather. This Project will allow continuous work for individuals usually laid off during the winter months and, depending on who is awarded this contract, may allow the contractor to increase the number of their full-time staff. Although this project will only last a few years, the applicant and Co-Applicants plan to continue grant applications to gain funding until COID's entire system is piped and pressurized. This will allow decades of job security for individuals involved in every step of the project from manufacturing of materials to the final installation.

The Project may also generate moderate job retention in NUID as increased water reliability will allow NUID patrons to increase production or convert to higher value crops. Many NUID patrons fallow a percentage of their acreage due to water insecurity. Increased water reliability will allow these patrons to increase operations. With years of consecutive drought and severely curtailed irrigation allotments, some NUID farms are literally on the brink of survival. See Q 16(b) and (f) for additional information.

b. Does the project increase economic activity? If so, explain.

This project will generate financial benefit in NUID and the broader Jefferson County agricultural economy. Financial benefits associated with increased access to water are outlined in a draft memo produced under the Reclamation Water Marketing Study entitled North Unit Irrigation District Demand Analyses (see Attachment 9). The analyses estimates the following revenue increases associated with each additional acre-foot of water available to NUID farmers: for alfalfa, $245/acre, $0.5-$1.1 million across the District, and $0.8-$2.3 million in regional economic impact. For bluegrass seed and carrot seed, respectively, an additional acre-foot generates $875-$3,100/acre; $0.9M-$10.3M District-wide; and $1.5M-$17.1M in regional economic impact. This project will track these financial benefits as additional acre-feet of water are made available to NUID farmers, based on crop type and as part of Applicant and Co-Applicant's RCPP grant with NRCS.

c. Does the project result in increases in efficiency or innovation? If so, explain.

Deschutes Basin's soil is predominantly shallow with a high sand content that lies directly over a series of basalt lava flows. Sand particles are larger than both silt and clay, which equates to larger spaces between soil particles. This larger space allows water to transpire through the soil faster due to a smaller adhesion coefficient between water molecules and soil particles. Basalt lava flows contains many fissures and lava tubes that may open with water infiltration and as weathering occurs. Piping will allow the mitigation of all evapotranspiration losses of water, while also allowing the capture of gravitational pressure. This will eventually allow all water users within the district to utilize pressurized water without a pump electric bill. This would drop the landowners cost to change to a pressurized system by 50% and help drive the change-over from inefficient flood irrigation to a more efficient pressurized irrigation system. The pressurized irrigation system can then be regulated with moisture sensors allowing an innovative step towards saving water. As more of the COID ditches are piped the additional pressure will have to be released, with the end goal of these locations being used for hydropower. This will create the most efficient system possible, while generating clean power for thousands of homes within Central Oregon.

Through the improvement of irrigation infrastructure, this Project will increase water delivery efficiency resulting in less effort and maintenance by COID staff and increased water reliability from the elimination of seepage. The District's antiquated, open, and unlined canals and laterals make it difficult to deliver the correct amount of water to patrons at the correct time, particularly early and late in the irrigation season when water rights require the District to divert water at a reduced rate. At these reduced flow rates, small changes in streamflow at the diversion can have a large impact on when water is available at each point of delivery, and patrons may receive inconsistent flows. For example, a point of delivery near the end of a lateral may receive no water in the morning and excess water in the evening. Even with highly skilled and trained staff, efficient deliveries to patrons are hindered as water loss in the system must be accounted for and changes to diversion rates can take multiple days

before successfully meeting demand. Additionally, while the District works closely with patrons' irrigation schedules, if patrons do not use all the water scheduled for their delivery, excess water may spill onto non-productive lands at the ends of the conveyance system, into NUID's canal system, or into the Crooked River. (see Watershed Plan).

Operating and maintaining the District's open canals and laterals requires staff to clean the ditches, clean debris from trash racks, and adjust flows to patrons. The District serves small-sized parcels through a canal and lateral system originally designed for larger parcels. Roughly 40 percent of all tax lots served by COID canals and laterals in the project area are 5-acre or smaller parcels. The smaller water deliveries required by smaller parcels are more sensitive to fluctuations in system operations due to changes in streamflow, diversion amounts, or other patrons' deliveries. The District's unpressurized canal and lateral system compounds these challenges. Therefore, District staff invest proportionally more time to manage water delivery for these smaller-sized parcels than they would for larger parcels. (see Watershed Plan)

A piped and pressurized or partially pressurized system greatly increases conveyance efficiency, allowing patrons to adjust their deliveries to take the amount of water that they need when they need it and eliminating operational spills. This Project would immediately improve water delivery reliability for the patrons served by the J and L laterals by providing these patrons with pressurized deliveries. DRC, COID and the Deschutes County Soil and Water Conservation District recently received an NRCS Regional Conservation Partnership Program grant that will enhance the efficiencies resulting from this Project by working with patrons along the J and L Laterals to implement on-farm irrigation efficiency projects to best utilize pressurized water and optimize water conservation.

d. Does the project result in enhancement of infrastructure, farmland, public resource lands, industrial lands, commercial lands or lands having other key uses? If so, explain.

The Project will pipe 23,141 linear feet of open earth canal within COID, eliminating seepage and increasing the effectiveness and reliability of COID's water delivery infrastructure. Open canal and lateral systems require additional water, known as carry water, to facilitate an optimal schedule of flow through the system and ensure that the necessary volume of water reaches all points of delivery based on patrons' needs and water rights. (see Q 16(c)).

Project implementation will provide significant benefit to infrastructure, water users, agriculture, and instream values in the Deschutes Basin. This water conservation project will benefit private landowners who will have access to more efficient irrigation systems and pressurized water for on-farm water and power conservations. Piping private lateral systems also reduces management challenges within rotation systems for both patrons and the irrigation district. Reduced demand associated with

water conservation within COID will benefit irrigation districts with junior water rights, particularly North Unit Irrigation District, which is facing intensified water supply risk from increased drought and from regulatory requirements that winter flows be restored in the Upper Deschutes River. NUID farms in Jefferson County are literally on the brink of survival, which threatens the broader agricultural economy in the region. This project will provide much needed relief from intense scarcity.

e. Does the project enhance economic value associated with tourism or recreational or commercial fishing, with fisheries involving native fish of cultural significance to Indian tribes, or with other economic values resulting from restoring or protecting water instream? If so, explain.

Tourism is the single largest industry in Central Oregon with outdoor recreation contributing $1.06 billion to the region. Outdoor recreation is closely tied to the landscape, climate, and accessibility of opportunities in proximity to Bend, Oregon. One of the largest draws for visitors and residents alike is the Deschutes River. The river provides many opportunities for fishermen, kayakers, wildlife enthusiasts, campers, photographers, and many more. With dependance on the health and vitality of the Deschutes River to continue to provide recreation and tourism opportunities, protecting instream flow is a key component to supporting the local economy.

f. Does the project result in increases in irrigated land for agriculture? (which may include increasing irrigated acres, agricultural economic value, or productivity of irrigated land) If so, explain.

The Project proposes to increase the reliability of water supply to NUID, a junior irrigation district, via the pathway outlined in Q 5. NUID's annual water allocation has been restricted to roughly 47% of a full allocation in 16 out of the last 31 years (see Attachment 9), forcing NUID patrons to fallow land due to insufficient water supply. While this Project will not increase net irrigated acreage in NUID, an increase in reliable water supply will allow NUID patrons to increase both the economic value and productivity of their land by either increasing the yield on acreage in production, converting to a higher value crop, or converting fallowed lands to crop production.

As discussed in Q 16(b), this generates financial benefit in NUID and the broader Jefferson County agricultural economy. In addition to the revenue increases associated with each additional acre-foot of water available to NUID farmers described in Q 16(b), the draft report estimates the following net value ($/acre) for crop conversions: alfalfa hay to carrot ($3,546/acre), grain to carrot ($3,022), fallow to carrot ($3,022), alfalfa hay to bluegrass ($1,311), grain to bluegrass ($915) and fallow to bluegrass ($787).

While this Project alone may have limited benefits, it is a part of a broader basin wide effort that seeks to move 200 AF to NUID over the next couple of decades,

significantly changing the farming landscape for NUID patrons and Jefferson County communities.

17. Environmental Benefits – ORS 541.673(3)

    a. Describe any measurable improvements in protected streamflows that are likely to result from the project. First, fill in the table below by, 1) listing the existing water right information of the source water right to be moved, protected, or transferred instream, and 2) naming the legal means proposed to permanently dedicate and protect water instream by the Oregon Water Resources Department. After filling in the table, complete your answer to this question by describing how protected streamflows will result in the environmental public benefits in the box below the table. *Note: The legal protection of water instream MUST be included to receive a score for this public benefit. Projects which permanently dedicate water instream will receive a scoring bump in the environmental public benefit category.*

Legal Protection of Water Instream *(add rows to table as needed)*

Water right permit or certificate number to be used in transaction for instream protection (e.g., irrigation, reservoir, or AR/ASR; S-####)	**Rate(s) (cfs)/duty (ac-ft/ac) or volume (ac-ft) of the contributing water right**	**Estimated rate (cfs)/duty (ac-ft/ac) or volume (ac-ft) of water to be legally protected instream**	**Percent (%) of right to be legally protected instream****	**Transaction for Legal Means of Instream Protection (chose one)**
72279	1078.76 cfs	2 cfs	0.185%	☒ Instream transfer (see Note 1 below table) ☐ Allocation of Conserved Water ☐ Above ground storage release ☐ Below ground storage release
				☐ Instream transfer ☐ Allocation of Conserved Water ☐ Above ground storage release ☐ Below ground storage release
				☐ Instream transfer

				☐ Allocation of Conserved Water ☐ Above ground storage release ☐ Below ground storage release

Note 1: The Applicants propose to protect water conserved from this Project instream via a unique but tested regulatory pathway developed specifically to balance water needs in the Deschutes Basin. The process for the instream protection of the water savings resulting from this Project does not follow the traditional path of protecting conserved water through the Allocation of Conserved Water statute. Using this traditional pathway would not produce the highest priority environmental outcomes contemplated by this Project; namely to secure more winter instream flow in the Upper Deschutes River for the Oregon spotted frog (see HCP, website provided above).

Basin partners have been working with OWRD staff over the past several years to chart a process that both complies with its existing statutory authority and administrative rules and meets the specific needs of the Deschutes Basin as articulated in the HCP and Upper Deschutes Basin Study. Specifically, this process involves reducing water demand and increasing water supply through the implementation of conservation projects in COID—a senior irrigation district—then passing this water via a shared conveyance system to NUID—a junior irrigation district—for consumptive use by NUID patrons in exchange for NUID releasing an equivalent amount of stored water from Wickiup Reservoir in the winter to help meet HCP instream flow targets for the Oregon spotted frog. This pathway provides for multiple water needs in the basin: COID gains operation and delivery efficiency, NUID gains more reliable water, and the Oregon spotted frog gains an improvement in habitat conditions.

Stored water released under this pathway will be protected through an OWRD instream lease under ORS 537.348(2) and OAR 690-077 and retain the same priority date as the originating water right certificate. Oregon law does not currently provide for a pathway to permanently protect the storage water instream. While Oregon statute authorizes OWRD to approve permanent instream transfers of storage water rights (ORS 537.348), OWRD believes its administrative rules need further clarification to allow for approval of these permanent transfers. OWRD recently announced it will convene a Rules Advisory Committee in spring 2021 to address this issue. In addition, the Department of Justice recently concluded that OWRD did not have authority to approve changes in the character of use of stored water to include, inter alia, instream flows. Authority for this pathway is currently being pursued in the 2021 legislative session via HB 3103 and HB 3091. To ensure permanent protection of the stored water proposed for protection in this Project, absent rule clarification or authorizing legislation, Applicants and Co-Applicants propose to enter into an agreement specifying the instream lease would be renewed in perpetuity or until the State of Oregon provided the clarity needed for a permanent change.

Instream lease 1770 and CW-102 (see Attachment 8) provide examples of the proposed approach. Note the Memorandum of Agreement to Perpetually Lease Water to Instream Use, attached to CW-102 which explicitly provides for the perpetual leasing of water until a permanent pathway exists:
"[p]rior to the expiration of the lease, NUID shall apply to OWRD to renew the lease for an additional five-year term, and shall do so perpetually until such time as the statutes and rules are updated regarding reservoir storage rights. At such time that the statutes and rules are updated regarding reservoir storage rights, NUID shall coordinate with OWRD to have the leased water…incorporated into a permanent instream water right." (CW-102, p 20).
While this Project will not use the Conserved Water Statutes to allocate instream flow, Applicants and Co-Applicants propose to use this approach to ensure the permanent instream protection of conserved water from Wickiup Reservoir as proposed in this Project.
Pursuant to OAR 690-077-0076(2)(b), the owner of any storage facility which is the source of water for a lease must be a co-lessor. The Bureau of Reclamation is the storage facility owner of Wickiup Reservoir, the source of water proposed to be leased in this Project and must consent and agree to the lease application. NUID's revised contract with the Bureau provides for such consent (see Attachment 7: NUID/BOR Contract) and following the example set in IL-1770 may indicate such consent with an email to OWRD. (see Attachment 8, p. 1)

*****Attention: If awarded funding, the legal protection of water instream, described in the table above, will be a condition of funding. The grant agreement will specifically cite the percent identified above, not the estimated rate.*****

Describe how the protected streamflows accomplish one or more of the following:
(A) Supports the natural hydrograph;
(B) Improves floodplain function;
(C) Supports state- or federally-listed sensitive, threatened or endangered fish species;
(D) Supports native fish species of cultural importance to Indian tribes; or
(E) Supports riparian habitat important for wildlife:

Legal means by which water will be protected
The Applicants propose to protect water conserved from this Project instream via a unique but tested regulatory pathway developed specifically to balance water needs in the Deschutes Basin. The process for the instream protection of the water savings resulting from this Project does not follow the traditional path of protecting conserved water through the Allocation of Conserved Water statute. Using this traditional pathway would not produce the highest priority environmental outcomes contemplated by this Project; namely to secure more winter instream flow in the Upper Deschutes River for the Oregon spotted frog (see HCP).

Basin partners have been working with OWRD staff over the past several years to chart a process that both complies with its existing statutory authority and administrative rules and meets the specific needs of the Deschutes Basin as articulated in the HCP and Upper Deschutes Basin Study. Specifically, this process involves reducing water

demand and increasing water supply through the implementation of conservation projects in COID—a senior irrigation district—then passing this water via a shared conveyance system to NUID—a junior irrigation district—for consumptive use by NUID patrons in exchange for NUID releasing an equivalent amount of stored water from Wickiup Reservoir in the winter to help meet HCP instream flow targets for the Oregon spotted frog. (see page x of HCP and page x of Watershed Plan).

Stored water released under this pathway will be protected through an OWRD instream lease under ORS 537.348(2) and OAR 690-077 and retain the same priority date as the originating water right certificate. While Oregon statute allows for storage water rights to be permanently transferred instream (ORS 537.348), OWRD believes its administrative rules need further clarity to allow for approval of these transfers. OWRD recently announced it will convene a Rules Advisory Committee in spring 2021 to resolve this issue. To ensure permanent protection of the stored water in the absence of rule clarification, or legislation that allows for the change in the character of use of a storage right as is contemplated in HB 3103 currently before the legislature, an agreement would be established specifying that these instream leases would be renewed in perpetuity or until the State of Oregon provided the clarity and authority needed for a permanent change. Instream lease 1770 and CW-102 (attached as Attachment X) provide examples of the approach described above.

Legally protected flow resulting from this project will support 1) a state and federally listed threatened species, 2) support the natural hydrograph and 3) support riparian habitat.

The legally protected flow resulting from the Project will help achieve streamflow targets in the Upper Deschutes River to increase habitat for the ESA-listed Oregon spotted frog as identified in the Habitat Conservation Plan. The Oregon spotted frog is federally listed as a threatened species. The State of Oregon lists the frog as sensitive and places it on the sensitive-critical list.

While the historic range of the Oregon spotted frog extended from British Columbia to northern California, the Deschutes Basin is one of few primary population centers remaining for the species. Within the basin Oregon spotted frogs are present in wetlands from headwaters lakes and streams to Bend. In addition to the 34 known occupied sites on the covered lands, another 25 sites have been documented in adjacent waters off the covered lands. Along the Deschutes River, Oregon spotted frog habitats can be found in riverine and oxbow wetlands between Wickiup Dam and Bend. These wetlands have varying degrees of surface connection to the river. Most are directly connected during summer high-flow conditions and partially or completely isolated, if not completely dewatered, during the winter. Others are permanently isolated from the river and supported by flows from adjacent uplands that keep them inundated year-round. Most of the major identified wetland complexes along this reach of the Deschutes River are known to be occupied by Oregon spotted frogs.

One of the goals identified in the HCP for the Upper Deschutes River is to modify the storage and release of streamflow to provide more natural hydrologic support for all

Oregon spotted frog life stages (breeding, rearing, summer foraging, overwintering and seasonal movement/dispersal) within the Deschutes River between Wickiup Dam and Bend. Currently irrigation operations modify the timing and magnitude of flow in the Upper Deschutes River through the storage and release of irrigation water. The storage of water in Wickiup Reservoir results in extremely low flows between Wickiup Dam and Bend in many winters, and the release of stored water during the irrigation season results in unnaturally high flows in most summers. Low winter flows, particularly in the upper portion of this reach, may deprive Oregon spotted frogs of overwintering habitat and prevent local populations from maintaining a year-to-year presence. Low flows that extend into the early spring can leave the river channel and associated wetlands nearly dry, thereby inhibiting dispersal and breeding. Unnaturally high summer flows support occupied wetlands in the lower portions of the reach, but they also accelerate bank erosion and modify channel morphology in ways that may be detrimental to riverine wetlands and Oregon spotted frogs over the long term.
Legally protected flows from the Project will help achieve flow targets identified for the Upper Deschutes River in the HCP, which specifically contemplates projects like the one proposed here:
"For each acre-foot (or portion thereof) of live flow made available to NUID as a result of the piping of COID owned canals after the date of incidental take permit issuance, an equal volume of water shall be added to the minimum flow below Wickiup Dam from September 16 through March 31." (HCP).

The 753 AF conserved from the Project—and other planned projects like it—will help achieve HCP flow targets on time or ahead of schedule, accelerating benefits for Oregon spotted frog, a species in peril.

A more natural hydrograph, resulting from flow targets and timelines outlined in the HCP will specifically improve Oregon spotted frog life stages by increasing flows and associated wetland inundation levels at the beginning of the breeding season, and reducing fluctuation in flows during the breeding season. Oregon spotted frogs will have greater access to preferred breeding habitats (shallowly inundated emergent wetlands) and they will be less exposed to fluctuations in water level that can lead to stranding, desiccation or flushing. Summer rearing and foraging habitat for Oregon spotted frogs will improve on some of the covered lands and deteriorate on others. Improvements will be most apparent in Crane Prairie Reservoir, Crescent Creek, Little Deschutes River and Deschutes River, where water levels will be managed to maintain suitable conditions through the completion of larval development in late summer. (HCP).

b. Does the project result in water conservation? If so, explain.

The Project will reduce water demand in COID by eliminating seepage loss in part of COID's J Lateral and all of COID's L Lateral. These Laterals are currently open canals that require additional water, known as carry water, to facilitate an optimal schedule of flow through the system and ensure that the necessary volume of water reaches all

points of delivery based on patrons' needs and water rights. Over the course of conveyance, carry water is essentially "lost" to the ground. A piped system, however, has no loss, eliminating the need to divert excess carry water and allowing for this water to be reallocated to other uses. As stated previously, COID will convey the water conserved from the Project to NUID to increase the junior district's water reliability and will do so via "spill" into NUID's main canal that intersects the end of COID's conveyance system. Therefore, this Project will not reduce COID's diversion rate—the conserved water will be diverted and passed to NUID—but will reduce the amount of water COID needs to achieve the same outcomes (water at points of delivery) it achieved before piping.

The quantity of water conserved by this Project is estimated to be 2 cfs using seepage loss measurements performed in 2016 and 2017 (see Q 6). This Project contemplates another seepage loss measurement for the L-Lateral (see key tasks) to account for variable results from previous measurements. Measuring seepage is a proven method for estimating water saving from piping. COID will confirm these estimates with live flow measurements once the pipe is installed and make adjustments as necessary to ensure proper delivery of water to its patrons. The instream lease volume will reflect these confirmed numbers.

c. Describe the anticipated measurable improvement in groundwater levels that enhances environmental conditions in groundwater restricted areas or other areas.

Applicants expect no measurable improvement in groundwater levels as a result of this Project. One of the major goals of the Project is to eliminate seepage loss (up to 50%) into the porous, volcanic soil underlying COID's open earth canals, improving irrigation delivery efficiency, conserving water for other uses, saving energy and improving public safety. While no groundwater resources would be extracted or consumptively used as part of the Project, piping 23,141 linear feet of COID's laterals would affect groundwater hydrology associated with canal and lateral seepage, reducing recharge annually during the irrigation season. (cite). Therefore, implementation of the Project will have a minor, but long-term effect on groundwater in the vicinity of the project area.

A 2013 study by the USGS estimated the effects on groundwater recharge from changes in climate (reduced precipitation), groundwater pumping, and canal lining and piping. Using data from 1997 to 2008, the study indicated that since the mid-1990s, groundwater levels have dropped by approximately 5 to 14 feet in the central part of the Deschutes Basin (Gannett and Lite 2013). This study also indicated that approximately 10 percent of this decline in groundwater levels, approximately 0.5 to 1.4 feet, was due to canal lining and piping during this period. The study found climate and increased groundwater pumping are the primary factors affecting groundwater levels in the region. The USGS estimated that the combined effects of climate and groundwater pumping accounted for approximately 90 percent of the observed

decrease in groundwater levels in the region. (Watershed Plan citing Gannett and Lite 2013).

d. Describe if and how the project would create a measurable improvement in the quality of surface water or groundwater.

The Deschutes River is listed as an impaired waterway under Section 303(d) of the Clean Water Act because it does not meet one or more of the State of Oregon's water quality standards for salmon and trout, as well as other beneficial uses. Water management along the entire length of the Deschutes River affects temperature, dissolved oxygen, pH, and other water quality parameters, which in turn affects habitat conditions. There is not yet an existing Total Maximum Daily Load (TMDL) process in the basin, but we expect there will be one within the next decade.

COID's Watershed Plan-EA found that piping the COID delivery system would result in minor, long-term beneficial effects on irrigation water quality delivered to patrons by preventing contaminants in agricultural runoff, such as herbicides and pesticides, from entering the District's canals and laterals. (see Watershed Plan p. 60).

In addition, low streamflow in the Upper Deschutes River in the winter months exposes areas of the riverbed and riparian areas that expand when frozen and then contract when thawed, sloughing off sediment which are transported downstream with the start of irrigation season, contributing to water quality impairment. This is called "frost heave." The Project will result in measurable increases in streamflow in the Upper Deschutes in the winter months that could, in tandem with companion piping projects planned and currently underway, result in a decrease in sediment loading in this part of the river.

e. Does the project increase ecosystem resiliency to climate change impacts? If so, explain.

The Project contributes to an increase in ecosystem resiliency to climate change impacts. Climate change has been identified as a threat to the OSF, and the DBHCP was designed to continue providing benefits to the species and support recovery efforts in the face of climate change. The Upper Deschutes River conservation measures of the DBHCP are mostly commitments to maintain target instream flows. The flows will be met by reducing the storage, release and diversion of irrigation water, as needed. This Project will yield conserved water that is protected in the Upper Deschutes River during winter months, contributing to these flow targets. If climate change results in decreased availability of water, the instream flow targets of the DBHCP will have priority and irrigation uses of water will occur only if the flow targets are met. (HCP 10)

Restoring the historical ecological function of the Upper Deschutes River is considered a key path to restoring Oregon spotted frog habitat and improving connectivity between populations in this reach from Wickiup Dam to Bend. Restoration in this segment of the river is primarily dependent upon improvement to flows coupled with site-specific improvements to the riverbed and banks to more effectively convey water into oxbows and wetlands where Oregon spotted frogs occur. (see HCP 6-41)

One of the primary HCP goals of increasing instream flow in the Upper Deschutes River in winter months was to support riverine and wetland habitats capable of sustaining Oregon spotted frogs within this reach over the long term.(see HCP 6-18). Protected instream flow from this Project will contribute to the following (excerpted from the HCP, 6-18):

Wickiup Reservoir Objective 1-A: Provide flows in the Upper Deschutes River sufficient to sustain Oregon spotted frog breeding/rearing/nonbreeding habitat at multiple sites between Wickiup Dam and Bend, where breeding/rearing/nonbreeding habitat is defined as riverine wetlands meeting all of the following criteria:

• _Water current velocity of 1 foot/second or less.

• _Water depth of 6 to 12 inches from the onset of breeding through the completion of metamorphosis.

• _Year-round water depth of at least 9 inches or direct surface connection to the main river channel from the onset of breeding to the onset of overwintering.

• _Substrate cover of at least 50 percent vegetation dominated by herbaceous emergent, submergent or floating-leaved aquatic species.

• _Less than 25 percent coverage of woody plants and tall-growing emergent wetland species such as cattails.

(HCP 6-18).

The shift to a more natural hydrologic regime in the Upper Deschutes River, and reduced dependency on Wickiup Reservoir for irrigation water, allows for the capture of more water in times of greater precipitation and also allows for the flexible management of that water to supplement ecological function within the Upper Deschutes river system.

f. Does the project result in improvements that address one or more limiting ecological factors in the project watershed? If so, explain.

Altered hydrology in the Upper Deschutes River is the primary ecological factor addressed by the Project. As described in Q 17(a), the storage of water in the fall and winter reduces flows downstream of the reservoirs from natural levels, and when storage is released during irrigation season (spring and summer), flows are increased above natural levels between the reservoirs and to the points of diversion. This altered flow regime limits growth and production for several species including Oregon spotted frog, the focal species of this Project.

At the time of listing, the U.S. Fish and Wildlife Service (USFWS) evaluated potential threats to Oregon spotted frogs by breeding location and occupied watersheds, and summarized threats by subbasin. USFWS determined that one of the factors affecting the survival of the species is the present or threatened destruction, modification, or curtailment of its habitat or range. (HCP 1-12). The USFWS further identified hydrologic manipulation as a threat to the physical and biological features identified as essential for the conservation of the species, listing stabilization of extreme water fluctuations as a management activity that could ameliorate the threat from hydrologic manipulation. (HCP 1-13).

Additionally, Oregon Department of Fish and Wildlife (ODFW) noted in its Upper Deschutes River Subbasin Fish Management Plan (1996) that of the factors limiting fish production, the seasonally low water, or no water conditions in streams and rivers are probably the most significant factor in the Upper Deschutes River subbasin. (ODFW)

Specific impacts on fish habitat from regulated low flows during the non-irrigation season are:

1. Exposes areas of spawning gravel which directly impacts potential trout production.
2. Reduces trout cover used for rearing, feeding, and hiding.
3. Stream channel exposure results in a loss of aquatic invertebrate (trout food) production.
4. Trout are forced to concentrate in a few deeper pools, increasing their vulnerability to predation and harvest (legal and illegal).
5. Increases ice-induced mortality of trout during severe cold periods.
6. Dewaters adjacent wetlands and riparian areas which provide trout food and cover.
7. Exposes streambanks to freeze-thaw action resulting in breakdown and eventual loss when flows are increased.
8. Increases foot access to river sections not fishable at high water levels and concurrently reduces the ability to boat the river.

Conversely, specific impacts on fish habitat from regulated high flows during the irrigation season are:

1. Increases the rate of bank erosion and sediment load. Higher flows are causing changes in the meander sequence of the river.
2. Spawning gravels are moved to stream margins and become imbedded with sediment. Flow regulation has eliminated the short-term spring "flushing" flows that clean spawning gravel under natural flow conditions.

3. Increased bank erosion and sedimentation makes it difficult to maintain riparian and aquatic vegetation and breaks down the chain of primary food production, especially aquatic insects and the vegetation they depend on.
4. Reduces bank angling opportunity due to an increase in flow velocity, increased turbidity, and increased depths.
5. Inundation of streambanks during the growing season impacts growth of vegetation.

Water conserved and protected in the Upper Deschutes River in the winter through this Project will help alleviate the impacts on fish as listed above by increasing winter flows and decreasing reliable on, and hence release of, stored water.

18. Social/Cultural Benefits – ORS 541.673(4)

    a. Does the project promote public health and safety and of local food systems? If so, explain.

As noted in COID's Watershed Plan-EA piping in the Smith Rock-King Way project area will result in a minor effect on public safety because piping decreases risks to drowning and flooding. This extend of this benefit, however, is limited to the Project Area.

The open canals and laterals pose a risk to public safety during the irrigation season. In addition to multiple instances of injury, several drowning deaths and near drowning instances have occurred in the COID and adjacent district canals in 1996, 1997, 2004, 2016, and 2018 (Flowers 2004; Matsumoto 2016; Beechem 2018).

During the summer, water depths in the District's canals and laterals range between 2 to 6 feet, with water velocities up to 6 feet per second and flows of up to 500 cfs. These conditions make it difficult for a healthy, strong adult to stand in or climb out of a canal without assistance. A child or non-/weak-swimmer would have an even higher risk of drowning in a canal with these attributes. If a person or animal falls into a District canal, they could have serious difficulty gaining hold on the banks in order to climb out due to the volume and speed of the moving water. Barriers or fences at the top bank of the canals are not currently installed.

The failure of earthen canals and laterals and risk of localized flooding is also a concern for the COID. In 2005, a breach on the Central Oregon Canal lost a quarter-million gallons of water and flooded parts of eight homes in southwest Bend (Minoura 2005).

In 2015, Deschutes County was the fastest growing county in Oregon based on the Oregon Population Report (PSU 2015). Public safety risks associated with the open COID canals and laterals will continue to grow as the county's population grows. (see Watershed Plan p 13)

This Project will contribute to a decrease the drowning risk from the COID's open canals and laterals because it is converting open laterals to buried pipe. This Project would also decrease any potential flooding risk from potential canal breaches and overflow, and the durability of the pipe would increase seismic resiliency.

b. Does the project result in measurable improvements in conditions for members of minority or low-income communities, economically distressed rural communities, tribal communities or other communities traditionally underrepresented in public processes? If so, explain.

Applicants and Co-Applicants expect this Project to yield minor improvements in employment opportunities for members of minority or low-income communities associated with the expected increase in agricultural production and economy resulting from an increase in water security for NUID patrons (see Q X). NUID is located in Jefferson County where agriculture is a principal industry.

According to the 2019 census Jefferson County is 19.9% Hispanic and 18.3% American Indian. A 2018 survey by the Oregon State University Extension Service estimated the number of migrant and seasonal farm workers in Jefferson County as 469. Since the overwhelming majority of Oregon farm workers are Latinx, these figures estimate the number of Latinx individuals who work in seasonal agriculture and are not covered by unemployment insurance. Additionally, The U.S. Census Bureau estimates 234 Latinx individuals were employed in the "agriculture, forestry, fishing, hunting" sector in 2019. These jobs were covered by unemployment insurance and reported separately. (see latincommunityassociation.org).

c. Does the project promote recreation and scenic values? If so, explain.

By conserving water instream, this project promotes scenic vales and recreation. Restoring flow to an overallocated system contributes to increased fish and wildlife habitat, riparian vegetation, and overall health of the system. Recreation directly relates to the health and abundance of the river and provides opportunities accordingly for fishing, rafting, scenic and other recreational activities.

d. Does this project contribute to the body of scientific data publicly available in this state? If so, explain.

Individually, this Project will not result in collecting new scientific information and making it available to the public. However, this Project is part of a larger basin-wide effort to balance water needs in the basin, a large part of which is restoring a more natural hydrograph in the Upper Deschutes River per targets and timelines outlined in the HCP. The HCP does provide

for the collection of new scientific information through both implementation and effectiveness monitoring which will be publicly available. (see HCP, Chapter 7).

Additionally, this Project continues with the innovations in collaboration, water conservation and water marketing that are continuously under development in the Deschutes Basin and could be learned from and applied in other Basins in Oregon and in the Columbia Basin. Innovations will be a very important part of water management into the future and with effects and changes in water reliability related to climate change. The Deschutes Basin Water Collaborative actively seeks to engage in peer learning with other western basins facing similar challenges.

e. Does this project promote state or local priorities, including but not limited to the restoration and protection of native fish species of cultural significance to Indian tribes? If so, explain.

The Project promotes both state and local priorities as identified in the Upper Deschutes Basin Study, a collaborative basin planning effort. Stakeholders in the Deschutes Basin recently completed the Upper Deschutes River Basin Study (Basin Study), designed to consider long-standing water management issues in the Upper Deschutes Basin. The Basin Study was funded jointly by the Bureau of Reclamation (Reclamation) and OWRD and is a collaborative product of the Upper Deschutes Basin Study Work Group (BSWG), which comprised 38 stakeholders. The purpose of the study was to assess current and future water supply and demand in the Upper Deschutes Basin and to identify a range of potential strategies to address projected imbalances. Key water supply needs in the basin involve agricultural, instream, and municipal objectives.

The study identified that median shortages associated with meeting instream water rights and existing irrigation demands are approximately 130,000 AF. Shortages range up to 300,000 AF in dry years. To meet higher flows that will be required to meet Endangered Species Act needs under the HCP, median shortages are approximately 200,000 AF, ranging up to 400,000 AF in dry years.

Based on identified water supply shortages, the Basin Study examined potential water management options that could help meet future needs in the basin. Desired outcomes for the Basin Study were to identify and evaluate options for addressing low and altered streamflows to benefit ecological conditions while maintaining or improving water supply reliability and/or financial security for irrigated agriculture, and while planning to meet future groundwater mitigation needs for municipal, industrial, and commercial uses.

One option the Basin Study examined to help address water supply needs in the basin was
water conservation. The water conservation option considered specific tools related to agricultural demands, including piping district canals, piping privately owned laterals, and on-farm infrastructure upgrades (e.g., flood-to-sprinkler shifts in irrigation). Water

conservation can decrease irrigation demand in particular areas, making water available to meet other water needs in the basin and possibly increasing water security for other users.

Other benefits associated with water conservation infrastructure approaches include the following.
• Irrigation conservation is a proven tool in the Upper Deschutes Basin for increasing water supply.
• Upgrades to infrastructure improve management and operations.
• Infrastructure improvements do not affect the number or locations of irrigated acres.
• Piping canals and laterals increases opportunities for other tools such as water marketing.

This Project further demonstrates the efficacy of the water conservation option as a tool to help balance water needs in the Basin as identified in the Basin Study.

f. Does this project promote collaborative basin planning efforts, including but not limited to efforts under Oregon's Integrated Water Resources Strategy? If so, explain.

This Project is a direct result of, and in many ways, the culmination of an extensive history of collaboration in the Deschutes Basin. In 1996, the Deschutes River Conservancy was formed by the Confederated Tribes of the Warm Springs Reservation, irrigation and environmental interests, and with a diverse board of directors, to restore streamflow and water quality through collaboration and consensus-building. To date, the DRC and its partners have restored over 200 cfs to basin streams, while improving agricultural and municipal water supplies. In 2006, DRC, in partnership with the Deschutes Water Alliance completed a series of WaterSmart studies that explored how to meet needs for rivers, agriculture and cities in the unique context of the Deschutes Basin. DRC and partners continued to achieve goals in Whychus Creek, the Middle Deschutes River, Tumalo Creek and the lower Crooked River.

In 2012, the DRC and DWA recognized the scale and complexity of flow restoration needs in the Upper Deschutes River, a reach that had not yet received much attention, and resolved to focus collaborative planning efforts on restoring the Upper Deschutes River, the 72-mile reach between Wickiup Reservoir and the City of Bend. The DRC received a Cooperative Water Management Plan (CWMP) grant in 2013 to convene the diverse interests that rely on and have an interest in the Upper Deschutes River. Management of the Upper Deschutes River is driven by the storage and delivery of natural flow and stored water in three reservoirs for the use of five irrigation districts. Finding solutions in a way that restores flows and supports agriculture required deepening the level of coordination between all of these entities and the state, federal and local agencies. The 2013 CWMP funded the work of the Deschutes Water Planning Initiative, which included goal setting, a needs assessment, the development and evaluation of water supply options, and the development and modeling of water management scenarios. This effort provided an important start in bringing the parties together around shared goals in the Upper Deschutes and generating a foundation of information on strategies to meet needs.

In 2014, the Oregon spotted frog was listed as threatened under the Endangered Species Act, the Deschutes irrigation districts were developing a Habitat Conservation Plan under the ESA to reduce regulatory liability while implementing conservation measures, and partners recognized that more robust analytical tools were needed to come up with strategies to meet needs in the Upper Deschutes reach, in balance with other needs basin-wide. The Deschutes Water Planning Initiative members decided to pursue a Basin Study with Reclamation. This effort was successful and the Deschutes Water Planning Initiative became the Basin Study Work Group, a group of 42 interests that co-managed the Upper Deschutes River Basin Study with Reclamation.

The Basin Study generated a wealth of more specific information on supply and demand and strategies to reduce shortages. It upgraded state of the art models and modeled several water management scenarios put together by stakeholders. During this three-year period, the Basin Study Work Group met monthly and created a high level of engagement and education in a large group of diverse basin stakeholders. Reclamation recently finalized the Upper Deschutes River Basin Study Report (see Attachment X), which provides the foundation of information needed to put together a comprehensive basin management plan. Basin Studies are not meant to result in prescriptive plans, so the Basin Study Work Group completed its work with end of the study. The group, however, was interested in staying together to continue coordination, accelerate project implementation and develop a comprehensive plan. This led to the formation of the Deschutes Basin Water Collaborative in 2020. This group has 43 diverse members, a signed charter and established decision-making processes. (see https://www.coic.org/dbwc/).

The Deschutes Basin Water Collaborative will build on previous planning efforts and the extensive information generated in the Deschutes Water Planning Initiative and the Upper Deschutes River Basin Study, to develop a comprehensive regional water management plan that guides the implementation of water projects to meet needs for rivers, agriculture and growing communities. This plan will provide a roadmap to meet long-term needs in the Deschutes and will give the basin a powerful platform to ensure implementation results have as much benefit as possible to the resource and to communities. It can also help secure funding needed for implementation and to address barriers to implementation.

Stakeholders in the Deschutes Basin have demonstrated the ability to work together to develop and implement agreed upon goals. Within these collaborative efforts, stakeholders had the ability to discuss contentious issues to find collaborative solutions. The intend to use previous work, and analysis produced in the Basin Study, as the foundation for developing a comprehensive water management for the Upper Deschutes Sub-basin.

This Project is a direct outcome of the options identified in the Basin Study (see Q 18(e)) for balancing water needs in the Deschutes Basin. This approach was also emphasized in the HCP which contemplates protecting conserved water from piping projects in COID as a means of achieving flow targets and timelines in the Upper Deschutes River to support the Oregon spotted frog. (HCP).

VIII. Project Budget

Instructions: Please answer the following questions about the proposed project budget using the tables provided. All Grant and Other Funds must be allowable costs as described in the Department's Grant Budget Procedures and Allowable Costs document.

19. Please provide an estimated line item budget for the proposed project. Examples include: direct project specific costs, such as in-house staff salary, contractual services, travel and administrative costs. See the Budget Procedures and Allowable Costs on the OWRD Applications, Forms, and Guidance webpage for further guidance.

OVERALL PROJECT BUDGET Line Items	**Number of Units*** *(e.g. # of Hours)*	**Unit Cost** *(e.g. hourly rate)*	**In-Kind Match**	**Cash Match Funds**	**OWRD Grant Funds**	**Total Cost**
Materials				1,580,061	1,580,061	3,160,121
Contractual/Consulting				401,145	401,145	802,290
Staff Salary DRC/Benefits: Executive Director	65	85.34		2,774	2,774	5,547
Staff Salary DRC/Benefits: Program Manager	90	60.62		2,728	2,728	5,456
Staff Salary DRC/Benefits: Leasing Program Manager	90	61.78		2,780	2,780	5,560
Staff Salary DRC/Benefits: Project Coordinator	92	37.65		1,732	1,732	3,464
Staff Salary COID: Managing Director	16	72.12	1,154			1,154
Staff Salary COID: Dept. Managing Director	40	53.88	2,155			2,155
Staff Salary COID: Director of Water Rights	60	42.21	2,533			2,533
Staff Salary COID: Operations Manager	60	41.70	2,502			2,502
Staff Salary COID: Operations Technician	100	25.50	2,550			2,550
Equipment (must be approved)						
Supplies						
Other: Permitting				100,000	100,000	200,000
Other: Instream Lease				175	175	350
Administrative Costs**					209,308	209,139
Total			**10,894**	**2,091,394**	**2,300,533**	**4,402,821**

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

20. Identify the budget for each key task below. Key tasks identified below should be the same as the key tasks identified in Questions 9 and 10.

Key Tasks	In-Kind Match	Cash Match Funds	OWRD Grant Funds	Total Cost
Design		*123,484*	*123,484*	*246,968*
Cultural Resource Survey		11,250	11,250	22,500
County Road & SHPO Permitting		*100,000*	*100,000*	*200,000*
Construction	*1,154*	*264,424*	*264,424*	*530,002*
L Lateral Loss Measurements	*2,155*	*5,000*	*5,000*	*12,155*
Bid Solicitation and Contracting	*2,000*	*1,000*	*1,000*	*4,000*
Contract with NUID	*533*	*1,000*	*1,000*	*2,533*
Verification of Water Savings	*2,502*	*5,000*	*5,000*	*12,502*
Materials Procurement	*2,550*	*1,580,061*	*1,580,061*	*3,162,672*
Instream Lease		*175*	*175*	*350*
Total	**10,894**	**2,091,394**	**2,091,394**	**4,193,682**

IX. Match Funding

Instructions: Fill out the table below and attach the appropriate documentation for both secured and pending match (add rows as needed). Label the documentation as Attachment #3. Applications requesting grant funds must demonstrate match that at a minimum equals 25% of total project cost.

For secured funding, you must *attach a letter of support* from the match funding source that:

- Specifies the dollar amount identified for this project,
- Equals the dollar amount shown in the "Amount/Dollar Value" column in the table below, and
- Describes the work to be accomplished through the match.

For pending resources, you must attach *other written documentation showing a request* for the matching funds. Documentation must:

- Include the project name,
- Note the date on which a future funding application will be submitted,
- Identify the funding program from which funds are pending, and
- Provide evidence that the project is eligible for the funding program identified.

Match Funding Source (if in-kind, briefly describe the nature of the contribution)	**Type (✓ only One)**	**Status (✓ only One)**	**Amount/ Dollar Value**	**Date Match Funds Available** *(Month/Year)*
In-Kind, COID's staff time	☐cash ☒in-kind	☒secured ☐pending	10,894	4/2021
Match, RCPP's feasibility grant	☒cash ☐in-kind	☐secured ☒pending	2,091,394	pending
	☐cash ☐in-kind	☐secured ☐pending		
	☐cash ☐in-kind	☐secured ☐pending		
Total of Match Funds			= $2,102,288	

X. Storage-Specific Project Requirements (if not a storage project skip this section)

Instructions: If your proposal is for a storage project that will divert water under an existing or new storage water right or limited license, answer questions 21 through 23 in this section. If your proposal is for above-ground storage, also answer question 24 through 26. All other projects can skip this section.

21. Identify Storage Project Type: ☐ Above-Ground ☐ Below-Ground

22. Indicate the capacity of the storage project and any new-developed water below:
    a. What will be the *total* capacity of the storage project in acre-feet after completion? _____
    b. What will be the volume of the *newly-developed* water in acre-feet? _____

23. Answer the following "Yes/No" questions about the storage project.
    a. Will the project divert more than 500 acre-feet of surface water annually? Yes ☐ No ☐
    b. Will the project impound surface water on a perennial stream? Yes ☐ No ☐
    c. Will the project divert water from a stream that supports sensitive, threatened or endangered species? Yes ☐ No ☐

    If you answered "yes" to **any** of the questions above, (a), (b), or (c), the project will need a *Seasonally Varying Flow (SVF) Prescription*, determining the duration, timing, frequency and volume of flows (including ecological base flow), necessary for protection and maintenance of biological, ecological, and physical functions outside of the irrigation season. The Department will establish the SVF prescription after funding is awarded, for more information about this requirement, please contact Technical Coordinator, Rachel LovellFord at 503-986-0941.

24. **Above-Ground Storage Only:** If you answered "yes" to Question 23 (a), (b), or (c) above, your proposed project is above-ground storage, **and** you are requesting **grant** funding then a **minimum of 25%** of the newly developed water must be dedicated to instream use. This is separate from the SVF

Prescription. ***If awarded funding, the percentage identified below will be a condition of funding.*** *Note: Any storage project which permanently dedicates water instream will receive a scoring bump in the environmental public benefit category.*

Please identify the percentage of stored water to be dedicated to instream use. _____%

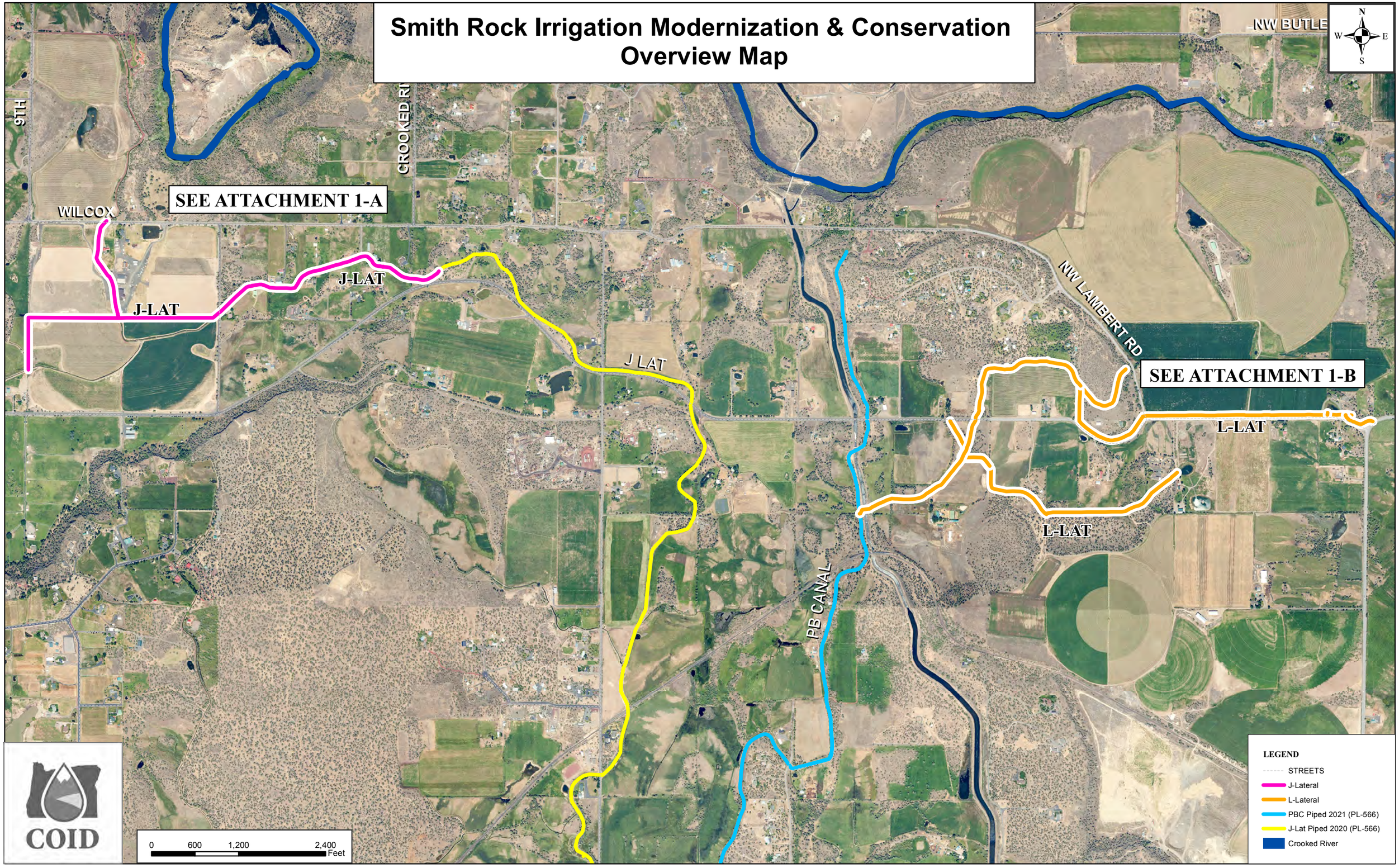
25. **Above-Ground Storage Only:** Into which stream(s) will the project release water? _____

26. **Above-Ground Storage Only:** How does the project control the outflow from the reservoir? Describe:
    a. What infrastructure governs changes to reservoir outflow rates?
    b. Whether changes to the outflow rate are made automatically or by hand.
    c. If water is released into more than one stream, what controls the rate of release and how much water goes to which stream?
    d. What are minimum and maximum release rates to each water source?
    e. Any other factors that limit the rate at which water is released from the reservoir.

ATTACHMENT 1: MAPS

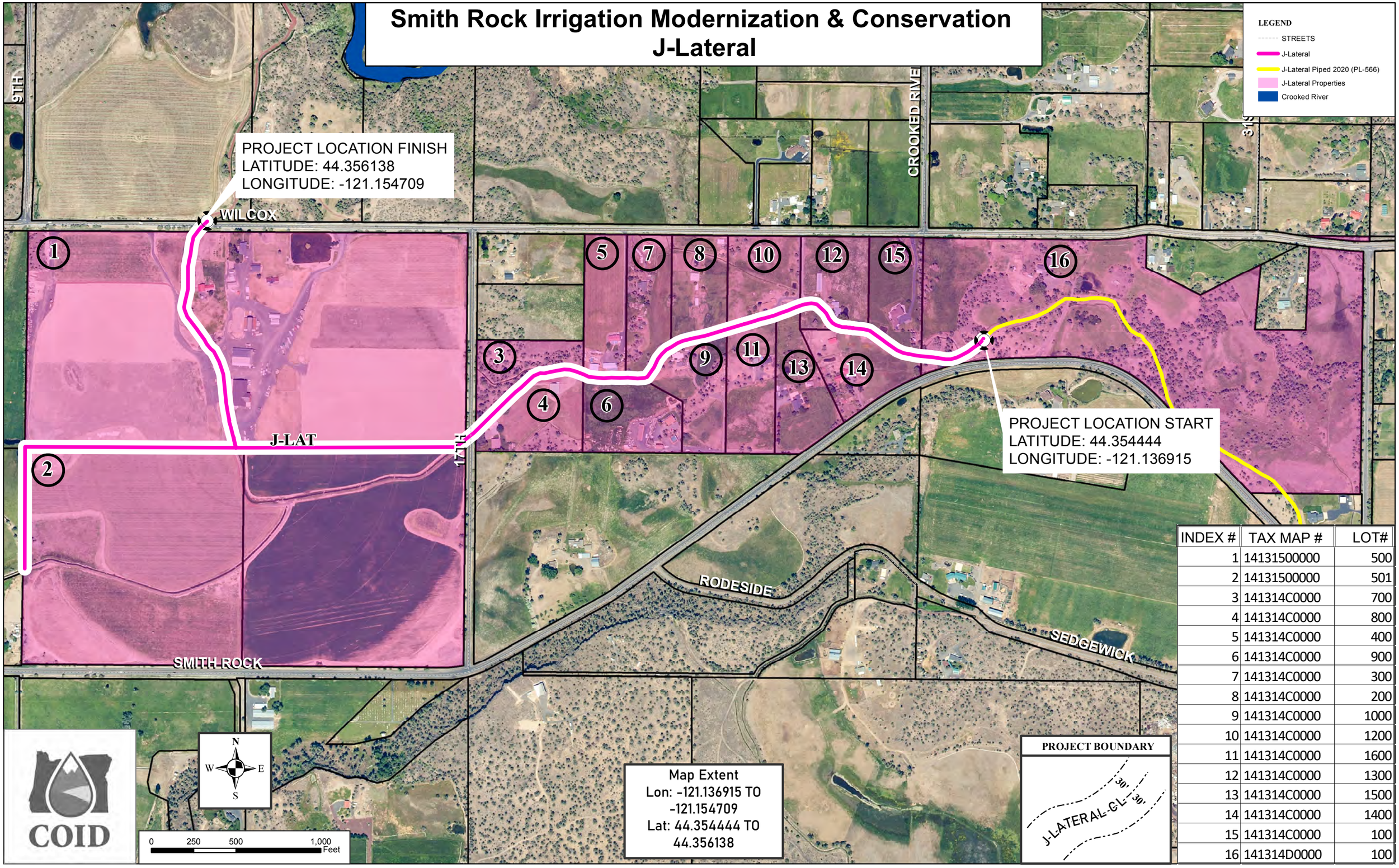
ATTACHMENT 1

Smith Rock Irrigation Modernization & Conservation Overview Map



ATTACHMENT 1-A

Smith Rock Irrigation Modernization & Conservation
J-Lateral



INDEX #	TAX MAP #	LOT#
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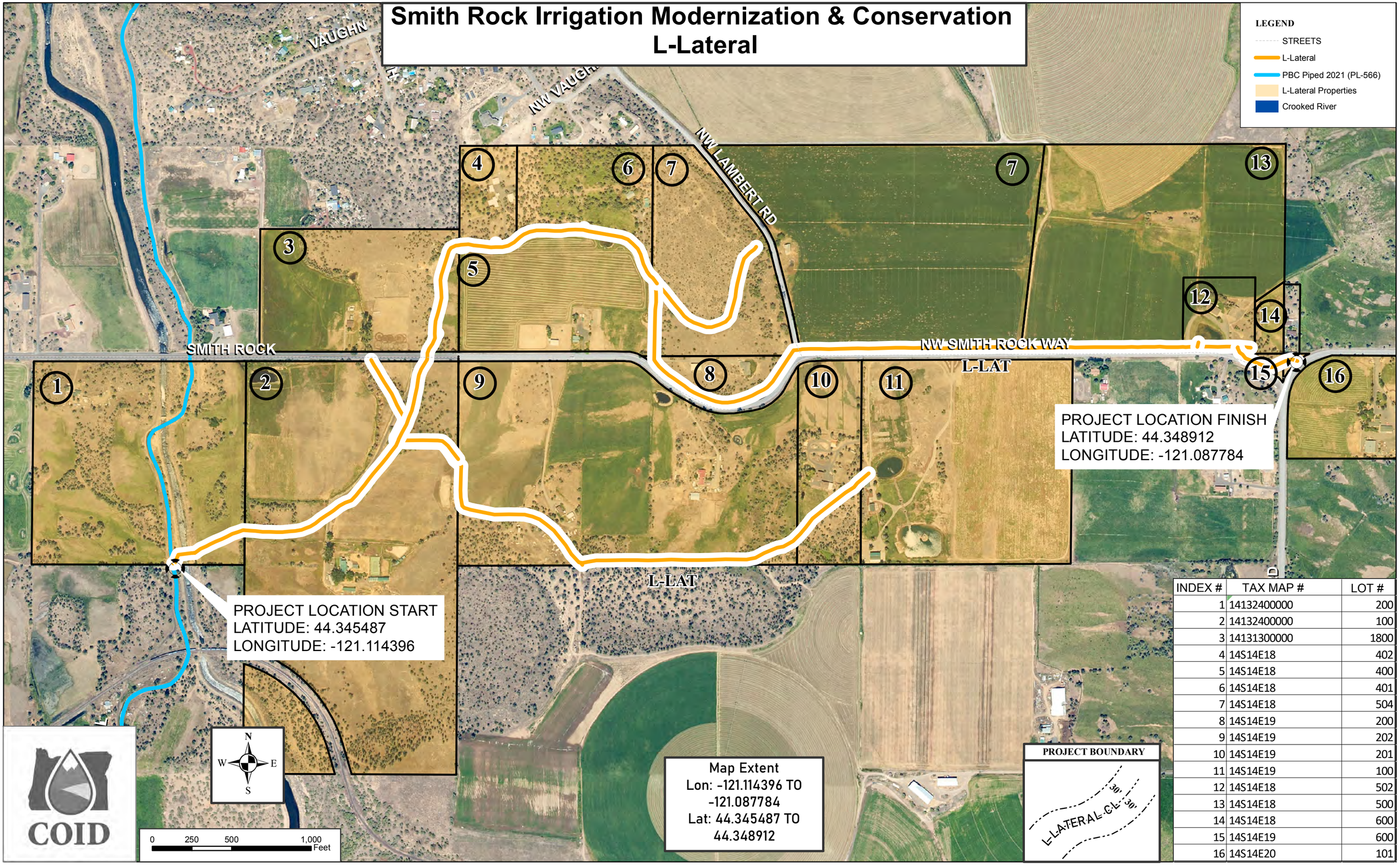
2	14131500000	501
3	141314C0000	700
4	141314C0000	800
5	141314C0000	400
6	141314C0000	900
7	141314C0000	300
8	141314C0000	200
9	141314C0000	1000
10	141314C0000	1200
11	141314C0000	1600
12	141314C0000	1300
13	141314C0000	1500
14	141314C0000	1400
15	141314C0000	100
16	141314D0000	100

ATTACHMENT 1-B

Smith Rock Irrigation Modernization & Conservation
L-Lateral



INDEX #	TAX MAP #	LOT #
1	14132400000	200
2	14132400000	100
3	14131300000	1800
4	14S14E18	402
5	14S14E18	400
6	14S14E18	401
7	14S14E18	504
8	14S14E19	200
9	14S14E19	202
10	14S14E19	201
11	14S14E19	100
12	14S14E18	502
13	14S14E18	500
14	14S14E18	600
15	14S14E19	600
16	14S14E20	101

ATTACHMENT 2: PROPERTY ACCESS FORM

OREGON
WATER RESOURCES DEPARTMENT

Water Project Grants and Loans

Landowner Agreement

Instructions to Applicants: Work with landowners to complete this form for all properties on which the proposed project would occur. Submit this completed form as part of your grant/loan application. For questions contact WRD_DL_waterprojects@oregon.gov.

Project and Applicant Information

Project Name: Smith Rock Irrigation Modernization and Conservation

Funding Applicant: Deschutes River Conservancy Co-Applicant (if applicable): Central Oregon Irrigation District

Funding Applicant Contact Information:
Name: Natasha Bellis
Phone Number: 541-382-4077
Email Address: natasha@deschutesriver.org

Co-Applicant Contact Information:
Name: Baxter Davies
Phone Number: 541-504-7573
Email Address: bdavies@coid.org

Landowner Information

Landowner(s) Name: Matthew W Lisignoli

Landowner Authorized Representative: Matthew W Lisignoli

Landowner Contact Information (or Authorized Representative)
Address: 1155 NE Smith Rock Way
(required) Terrebonne, OR 97760
(optional) Phone Number: _____
(optional) Email Address: _____

Property Information

List each property owned by the above-mentioned Landowner on which the project would occur:

County	Tax map	Lot number
Deschutes	14S13E- 141315	501

Landowner Acknowledgement

1. _____ is/are the legal owner(s) (the Landowner) of the above described property (the Property).
2. I am authorized to act on behalf of the Landowner.
3. I am aware of and agree to the above-mentioned proposed project and grant permission for the Applicant, and the Applicant's agents, to conduct the following activities on the Property. (List activities below)

a. Access Property
b. Ground Disturbing activity
c. Project Work
d. Excavate a trench for water pipe install

4. I am aware that monitoring information related to the Project is a matter of public record.
5. I certify that the above-mentioned information is true and accurate, I am aware of and agree to the proposed work, and I am authorized to sign as the Landowner or Authorized Representative.

Signature of Landowner or Authorized Representative: Matth Lisignoli
Date: 9-6-21 Print Name: MATTHEW LISIGNOLI
Kendra Lisignoli
KENDRA LISIGNOLI

OREGON
WATER RESOURCES DEPARTMENT

Water Project Grants and Loans

Landowner Agreement

Instructions to Applicants: Work with landowners to complete this form for all properties on which the proposed project would occur. Submit this completed form as part of your grant/loan application. For questions contact WRD_DL_waterprojects@oregon.gov.

Project and Applicant Information

Project Name: Smith Rock Irrigation Modernization and Conservation

Funding Applicant: Deschutes River Conservancy Co-Applicant (if applicable): Central Oregon Irrigation District

Funding Applicant Contact Information:
Name: Natasha Bellis
Phone Number: 541-382-4077
Email Address: natasha@deschutesriver.org

Co-Applicant Contact Information:
Name: Baxter Davies
Phone Number: 541-504-7573
Email Address: bdavies@coid.org

Landowner Information

Landowner(s) Name: Lisignoli, Matthew William and Kendra Lynn

Landowner Authorized Representative: Matthew W Lisignoli and Kendra Lynn Lisignoli

Landowner Contact Information (or Authorized Representative)
Address: 1250 NE Wilcox Ave
(required) Terrebonne, OR 97760
(optional) Phone Number: _____
(optional) Email Address: _____

Property Information

List each property owned by the above-mentioned Landowner on which the project would occur:

County	Tax map	Lot number
Deschutes	14S13E- 141315	500

Landowner Acknowledgement

1. _____ is/are the legal owner(s) (the Landowner) of the above described property (the Property).
2. I am authorized to act on behalf of the Landowner.
3. I am aware of and agree to the above-mentioned proposed project and grant permission for the Applicant, and the Applicant's agents, to conduct the following activities on the Property. (List activities below)

a. Access Property
b. Ground Disturbing activity
c. Project Work
d. Excavate a trench for water pipe install

4. I am aware that monitoring information related to the Project is a matter of public record.
5. I certify that the above-mentioned information is true and accurate, I am aware of and agree to the proposed work, and I am authorized to sign as the Landowner or Authorized Representative.

Signature of Landowner or Authorized Representative: Matthew Lisignoli
Date: 4-6-21 Print Name: MATTHEW LISIGNOLI
Kendra Lisignoli
KENDRA LISIGNOLI

ATTACHMENT 3: MATCH DOCUMENTATION

CENTRAL OREGON
Irrigation
DISTRICT
Since 1918

April 28, 2021

To whom it may concern:

Central Oregon Irrigation District is pledging $10,894 of in-kind match funding to support the Smith Rock-King Way Irrigation and Modernization Project. In-kind support will provide construction oversight, loss measurements, bid solicitation and contracting, contracting with NUID, verification of water savings, general project management for COID.

Regards,

Shon Rae
Deputy Managing Director

May 5, 2021

Becky Williams
Grant Program Coordinator
Oregon Water Resources Department
725 Summer Street, NE
Salem, OR 97301

RE: NRCS RCPP Match

Dear Ms. Williams:

Please accept this letter as documentation that the Natural Resources Conservation Service has tentatively selected the Smith Rock Irrigation Modernization and Conservation Project for $2,600,000 in funding under the Regional Conservation Partnership Program (RCPP).

Based on the RCPP project proposal, $2,102,288 will be used to match piping of Central Oregon Irrigation District's J and L laterals, as proposed in Deschutes River Conservancy's and COID's current Water Project Grants and Loans application to your Department.

Sincerely,

Tom Miewald
Oregon Regional Conservation Partnership Program Coordinator
503-414-3242

ATTACHMENT 4: SYSTEM IMPROVEMENT PLAN EXCERPTS (SEEPAGE LOSSES)

COI P.B. Canal - DISCHARGE FLOW MEASUREMENTS

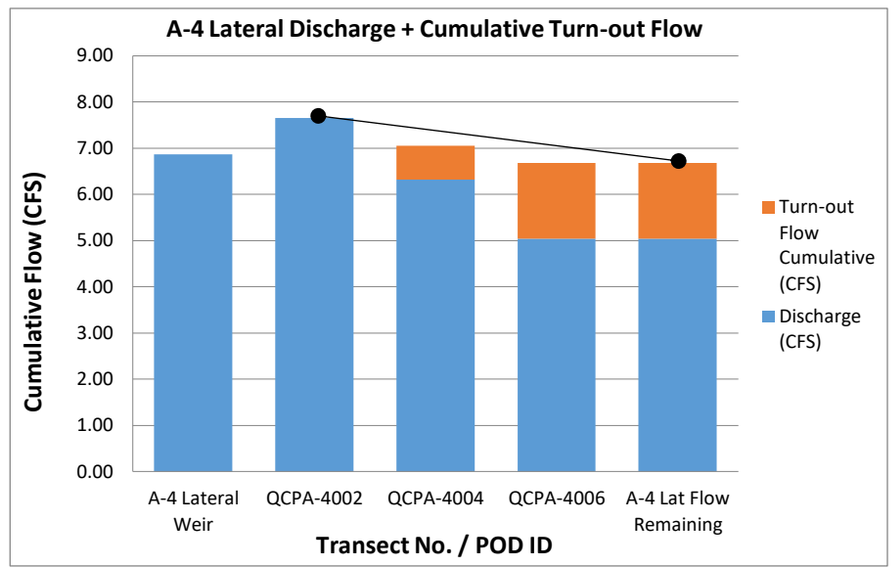
Final
03-08-2017

	= Spill (Loss)
	= Not Measured or Estimated
	= Return Flow
	= Turn-outs to Laterals and Sub Laterals

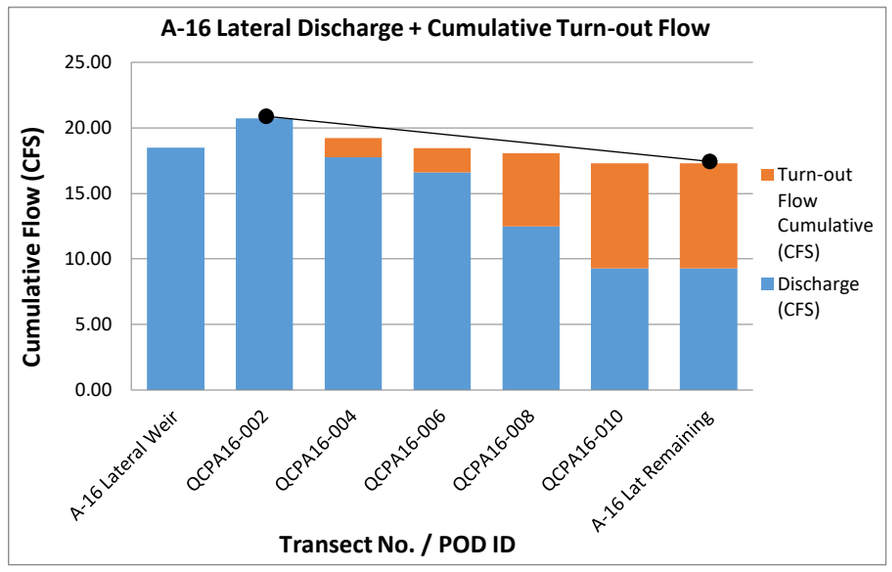
Transect No. POD #ID	Discharge (CFS)	Turn-out Flow Rate (CFS)	Turn-out Flow Cumulative (CFS)	Comments	
A-4 Lateral					A-4 Lateral Canal
A-4 Lateral Weir	**6.87**		0.00	4.0 ft Cipolletti weir, 7.75 inch depth @ crest	
QCPA-4002	**7.65**		0.00	Measurement rated as "Fair"	
A-4-7		-0.73		328 gpm flow estimated in the field	
QCPA-4004	**6.32**		0.73	Measurement rated as "Good"	
A-4-7.1				OFF	
A-4-8				OFF	
A-4-8.1		-0.02		1.0 ft Cipolletti weir, 0.375 inch depth @ crest	
A-4-9		-0.73		2.0 ft Cipolletti weir, 2.75 inch depth @ crest	
A-4-10		-0.16		70 gpm flow estimated in the field	
QCPA-4006	**5.04**		1.64	Measurement Rated as "Poor"	
A-4 Lat Flow Remaining	**5.04**		1.64		
A-16 Lateral					A-16 Lateral
A-16 Lateral Weir	**18.50**		0.00	8.0 ft Cipolletti weir, 9.5 inch depth @ crest	
QCPA16-002	**20.71**		0.00	Measurement Rated as "Fair"	
Return Flow		*0.04*		20 gpm return flow, estimated in the field	
A-16-2		-0.23		105 gpm flow estimated in the field	
A-16-3		-1.28		2.0 ft Cipolletti weir, 4.0 inch depth @ crest	
QCPA16-004	**17.75**		1.47	Measurement Rated as "Fair"	
A-16-5		-0.37		2.0 ft Cipolletti weir, 1.75 inch depth @ crest	
QCPA16-006	**16.61**		1.84	Measurement Rated as "Good"	
A-16-6		-0.83		2.0 ft Cipolletti weir, 3.0 inch depth @ crest	
A-16-7		-0.64		2.0 ft Cipolletti weir, 2.5 inch depth @ crest	
A-16-7.1		0.00		OFF	
A-16-8		-2.29		2.0 ft Cipolletti weir, 5.875 inch depth @ crest	
QCPA16-008	**12.48**		5.60	Measurement Rated as "Good"	
A-16-9		-0.22		100 gpm flow estimated in the field	
A-16-9.1		-0.02		10 gpm flow estimated in the field	
A-16-10.0		-0.73		2.0 ft Cipolletti weir, 2.75 inch depth @ crest	
A-16-10.1		0.00		OFF	
A-16-10.2		-0.50		2.0 ft Cipolletti weir, 2.125 inch depth @ crest	
A-16-11		-0.54		2.0 ft Cipolletti weir, 2.25 inch depth @ crest	
A-16-11.1		-0.11		48 gpm flow estimated in the field	
A-16-11.0		-0.05		24 gpm flow estimated in the field	
A-16-11-2		-0.24		108 gpm	
QCPA16-010	**9.29**		8.01	Measurement Rated as "Excellent"	
A-16 Lat Remaining	**9.29**		8.01		
A-21 Lateral					A-21 Lateral
A-21 Lateral Weir	**19.98**		0.00	8.0 ft Cipolletti weir, 10.0 inch depth @ crest	
QCPA21-002	**19.03**		0.00	Measurement Rated as "Good"	
A-21-1		0.00		OFF	
A-21-2		-0.64		2.0 ft Cipolletti weir, 2.5 inch depth @ crest	
A-21-4		-0.19		2.0 ft Cipolletti weir, 1.125 inch depth @ crest	
A-21-5		-3.43		4.0 ft Cipolletti weir, 4.875 inch depth @ crest	
QCPA21-004	**13.57**		4.26	Measurement Rated as "Good"	
A-21-6		-0.50		2.0 ft Cipolletti weir, 2.125 inch depth @ crest	
A-21-7		-1.28		2.0 ft Cipolletti weir, 4.0 inch depth @ crest	
A-21-7-1		-0.13		60 gpm flow estimated in the field	
A-21-8		-1.05		2.0 ft Cipolletti weir, 3.5 inch depth @ crest	
A-21-9		-0.83		2.0 ft Cipolletti weir, 3.0 inch depth @ crest	
A-21-10		-1.73		2.0 ft Cipolletti weir, 4.875 inch depth @ crest	
A-21-10-1		-0.59		2.0 ft Cipolletti weir, 2.375 inch depth @ crest	
A-21-9-0-2		-0.17		75 gpm flow estimated in the field	
A-21-9-0-3		-0.09		42 gpm flow estimated in the field	
QCPA21-006	**6.32**		10.63	Measurement Rated as "Poor"	
A-21 Lat Remaining	**6.32**		10.63		

Over-all P.B. Canal Discharge Measurements

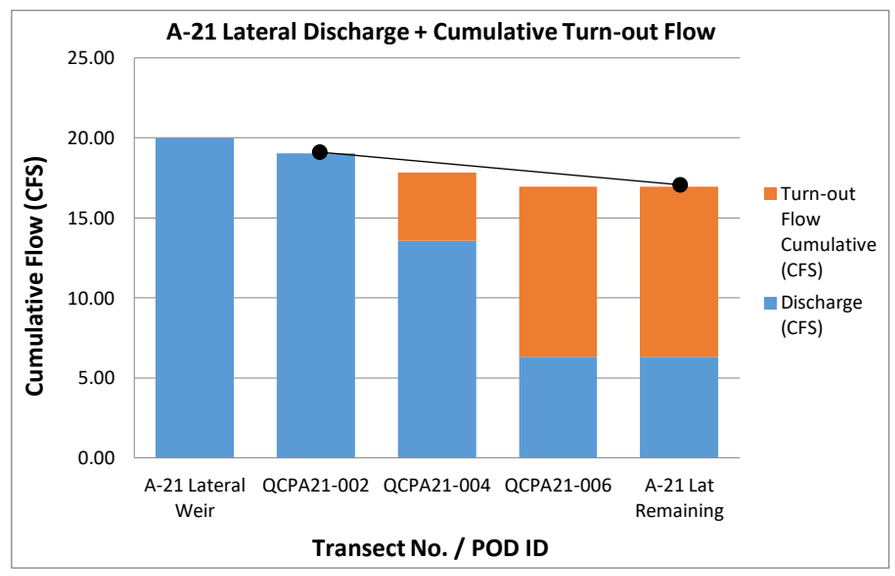
Over-all P.B. Canal Intake to Study Reaches	=	373.74	
Over-all P.B. Canal Spill from Study Reaches	=	0.00	
Over-all P.B. Canal Turnouts + Flow Remaining	=	-331.70	
Over-all P.B. Canal Seepage Loss in Study Reaches	=	42.04	= 11.25%



A-4 Lateral Intake to the Study Reach	=	7.65
A-4 Lateral Spill from the Study Reach	=	0.00
A-4 Lateral Turnouts + Flow Remaining	=	-6.68
A-4 Lateral Seepage Loss in the Study Reach	=	0.97 = 12.73%



A-16 Lateral Intake to the Study Reach	=	20.71
A-16 Lateral Spill from the Study Reach	=	0.00
A-16 Lateral Turnouts + Flow Remaining	=	-17.30
A-16 Lateral Seepage Loss in the Study Reach	=	3.42 = 16.49%



A-21 Lateral Intake to the Study Reach	=	19.03
A-21 Lateral Spill from the Study Reach	=	0.00
A-21 Lateral Turnouts + Flow Remaining	=	-16.95
A-21 Lateral Seepage Loss in the Study Reach	=	2.07 = 10.90%

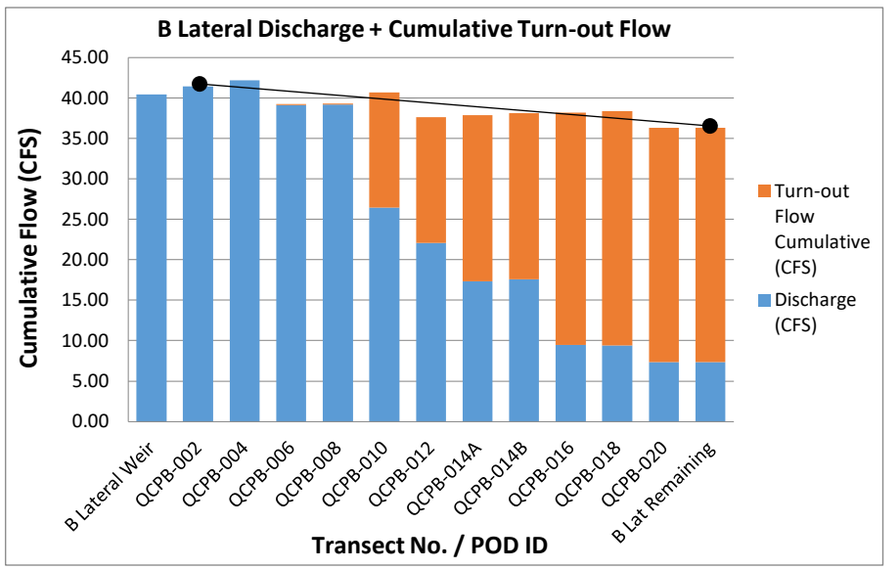
COI P.B. Canal - DISCHARGE FLOW MEASUREMENTS

Final
03-08-2017

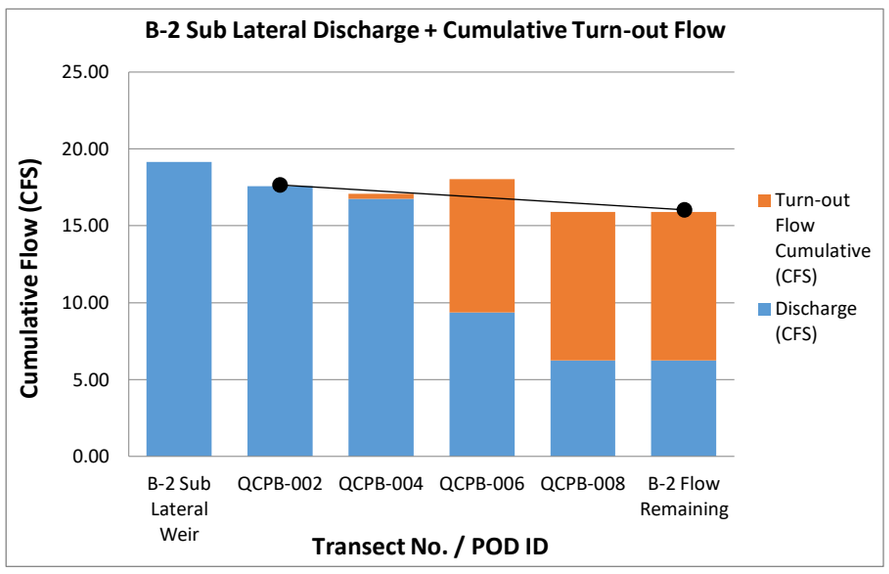
Transect No. POD #ID	Discharge (CFS)	Turn-out Flow Rate (CFS)	Turn-out Flow Cumulative (CFS)	Comments
B Lateral				
B Lateral Weir	**40.42**		0.00	8.0 ft Cipolletti weir, 16.0 inch depth @ crest
QCPB-002	**41.46**		0.00	Measurement Rated as "Good"
QCPB-004	**42.21**		0.00	Measurement Rated as "Good"
B-01		-0.09		42 gpm flow estimated in the field
B-01-2		0.00		OFF - removed
B-03		0.00		OFF
B-04				No measurement recorded
QCPB-006	**39.14**		0.09	Measurement Rated as "Good"
B-3		0.00		OFF
B-4		0.00		OFF
QCPB-008	**39.21**		0.09	Measurement Rated as "Fair"
B-4-1		-0.22		100 gpm flow estimated in the field
B-6		-0.44		200 gpm flow estimated in the field
B-6-1		-0.33		150 gpm flow estimated in the field
B-8		-0.46		2.0 ft Cipolletti weir, 2.0 inch depth @ crest
B-5		-2.44		4.0 ft Cipolletti weir, 3.875 inch depth @ crest
B-8-2		-0.22		98 gpm flow estimated in the field
B-9		-1.22		2.0 ft Cipolletti weir, 3.875 inch depth @ crest
B-12		-1.75		784 gpm flow estimated in the field
B-7		-7.04		4.0 ft Cipolletti weir, 7.875 inch depth @ crest
QCPB-010	**26.46**		14.21	Measurement Rated as "Good"
B-13		-0.13		2.0 ft Cipolletti weir, 0.875 inch depth @ crest
B-14		-1.22		2.0 ft Cipolletti weir, 3.875 inch depth @ crest
QCPB-012	**22.07**		15.56	Measurement Rated as "Poor"
B-14-6		-0.03		15 gpm flow estimated in the field
B-15		-0.83		2.0 ft Cipolletti weir, 3.0 inch depth @ crest
B-16		-0.35		2.0 ft Cipolletti weir, 1.625 inch depth @ crest
B-16-1		0.00		OFF
B-17		-0.35		2.0 ft Cipolletti weir, 1.625 inch depth @ crest
B-10		-3.43		4.0 ft Cipolletti weir, 5.875 inch depth @ crest
QCPB-014A	**17.30**		20.55	Measurement Rated as "Fair"
QCPB-014B	**17.59**		20.55	Measurement Rated as "Fair"
B-18		-0.16		2.0 ft Cipolletti weir, 1.0 inch depth @ crest
B-19		-0.23		2.0 ft Cipolletti weir, 1.25 inch depth @ crest
B-19-0		0.00		OFF
B-11		-7.20		4.0 ft Cipolletti weir, 8.0 inch depth @ crest
B-19-1		-0.19		2.0 ft Cipolletti weir, 1.125 inch depth @ crest
B-19-1-1		0.00		OFF
B-19-2		-0.40		180 gpm flow estimated in the field
QCPB-016	**9.46**		28.73	Measurement Rated as "Fair"
B-19-3		-0.17		1.0 ft Cipolletti weir, 1.625 inch depth @ crest
B-19-4		-0.06		25 gpm flow estimated in the field
B-21		-0.02		10 gpm flow estimated in the field
QCPB-018	**9.42**		28.98	Measurement Rated as "Good"
B-22		0.00		OFF
B-22-1		0.00		OFF
B-23		0.00		OFF
B-23-1		0.00		OFF
QCPB-020	**7.33**		28.98	Measurement Rated as "Fair"
B Lat Remaining	**7.33**		28.98	
B-2 Sub Lateral				
B-2 Sub Lateral Weir	**19.14**		0.00	
QCPB-002	**17.57**		0.00	Measurement Rated as "Fair"
B-2-0-0		0.00		OFF
B-2-0-1		-0.19		1.0 ft Cipolletti weir, 1.75 inch depth @ crest
B-2-0-2		-0.07		30 gpm flow estimated in the field
B-2-1				No measurement recorded
B-2-2		-0.03		1.0 ft Cipolletti weir, 0.5 inch depth @ crest
B-2-2-0		0.00		OFF
B-2-2-1		0.00		OFF
B-2-3		0.00		OFF
B-2-3-1		-0.04		18 gpm flow estimated in the field
B-2-3-2		0.00		OFF
QCPB-004	**16.76**		0.33	Measurement Rated as "Fair"
B-2-5		-0.73		2.0 ft Cipolletti weir, 2.75 inch depth @ crest
B-2-5-1		-0.59		2.0 ft Cipolletti weir, 2.375 inch depth @ crest
B-2-6		0.00		OFF
B-2-6-1		0.00		OFF
B-2-4		-6.54		4.0 ft Cipolletti weir, 7.5 inch depth @ crest
B-2-6-2		-0.03		15 gpm flow estimated in the field
B-2-7-1		-0.13		60 gpm flow estimated in the field
B-2-7		-0.30		2.0 ft Cipolletti weir, 1.5 inch depth @ crest
QCPB-006	**9.38**		8.65	Measurement Rated as "Fair"
B-2-8		-0.83		2.0 ft Cipolletti weir, 3.0 inch depth @ crest
B-2-9		0.00		OFF

B Lateral

B-2 Sub Lateral



B Lateral Intake to the Study Reach	=	41.46
B Lateral Spill from the Study Reach	=	0.00
B Lateral Turnouts + Flow Remaining	=	-36.31
B Lateral Seepage Loss in the Study Reach	=	5.15 = 12.43%

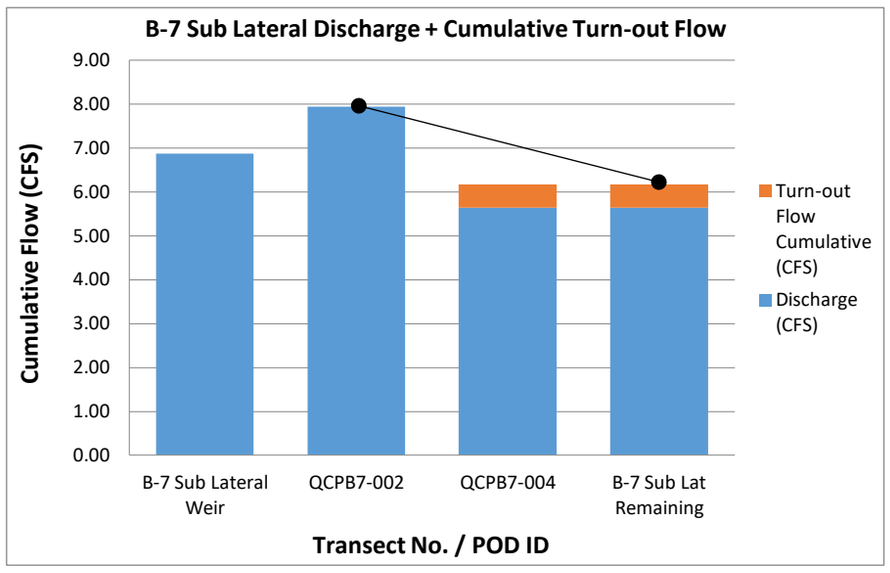


B-2 Sub Lateral Intake to the Study Reach	=	17.57
B-2 Sub Lateral Spill from the Studt Reach	=	0.00
B-2 Sub Lateral Turnouts + Flow Remaining	=	-15.89
B-2 Sub Lateral Seepage Loss in the Study Reach	=	1.68 = 9.54%

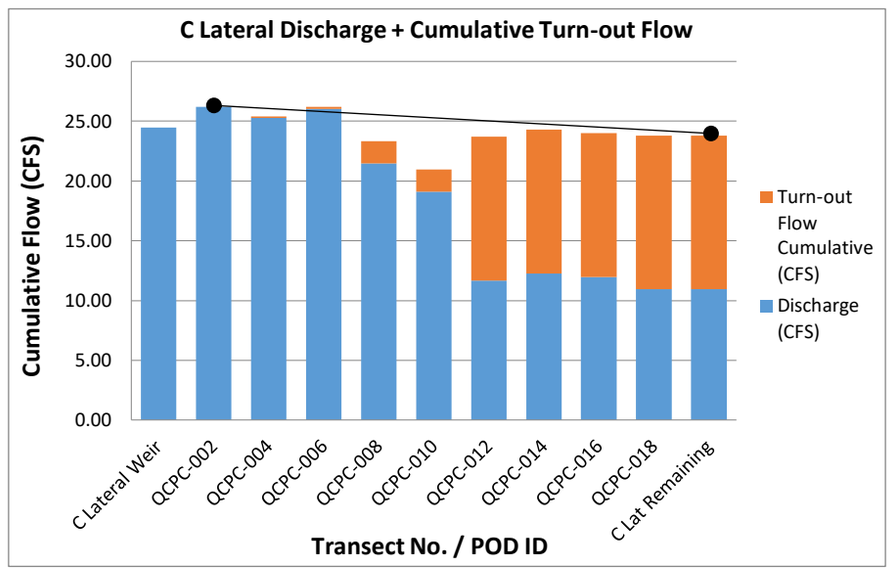
COI P.B. Canal - DISCHARGE FLOW MEASUREMENTS

Final
03-08-2017

Transect No. POD #ID	Discharge (CFS)	Turn-out Flow Rate (CFS)	Turn-out Flow Cumulative (CFS)	Comments	
B-2-10		-0.16		2.0 ft Cipolletti weir, 1.0 inch depth @ crest	
B-2-10A		0.00		OFF	
QCPB-008	**6.25**		9.64	Measurement Rated as "Fair"	
B-2 Flow Remaining	**6.25**		9.64		
B-7 Sub Lateral (Supplemental Flow Measurements 8-29-16)					B-7 Sub Lateral
B-7 Sub Lateral Weir	**6.87**		0.00	4.0 ft Cipolletti, 7.75 inch depth, shallow pool, hig	
QCPB7-002	**7.94**		0.00	Measurement Rated as "Good"	
B-7-0		-0.16		2.0 ft Cipolletti weir, 1.0 inch depth @ crest	
B-7-1		-0.33		2.0 ft Cipolletti weir, 1.625 inch depth @ crest	
B-7-1-0		-0.07		1.0 ft Cipolletti weir, 0.875 inch depth @ crest	
Return Flow		0.02		5-10 gpm return flow, estimated flow	
QCPB7-004	**5.64**		0.54	Measurement Rated as "Poor"	
B-7 Sub Lat Remaining	**5.64**		0.54		
C Lateral					C Lateral
C Lateral Weir	**24.46**		0.00	10 ft Cipolletti weir, 9.875 inch depth @ crest	
QCPC-002	**26.21**		0.00	Measurement Rated as "Good"	
C-2-1		-0.11		1 ft Cipolletti weir, 1.25 inch depth @ crest	
QCPC-004	**25.28**		0.11	Measurement Rated as "Good"	
C-2-2		0.00		OFF	
C-3		0.00		OFF	
C-7		-0.04		20 gpm flow estimated in the field	
C-10		-0.03		15 gpm flow estimated in the field	
QCPC-006	**26.03**		0.18	Measurement Rated as "Fair"	
C-5		-1.56		4 ft Cipolletti weir, 2.875 inch depth @ crest	
C-13		-0.01		5 gpm flow estimated in the field	
C-14-1		0.00		OFF	
C-14-1-1		-0.11		50 gpm flow estimated in the field	
QCPC-008	**21.46**		1.86	Measurement Rated as "Fair"	
C-14-4		-0.01		5 gpm flow estimated in the field	
C-15-1B		0.00		OFF	
C-15-1A		0.00		OFF	
C-15-1		0.00		OFF	
QCPC-010	**19.09**		1.87	Measurement Rated as "Fair"	
C-16		-0.05		24 gpm flow estimated in the field	
C-6		-0.17		75 gpm flow estimated in the field	
C-16-1		0.00		OFF	
C-19		-0.40		1 ft Cipolletti weir, 2.875 inch depth @ crest	
C-8		-2.17		2.0 ft Cipolletti weir, 5.625 inch depth @ crest	
C-8-1		-0.03		15 gpm flow estimated in the field	
C-9		-5.43		3.0 ft Cipolletti weir, 8.0 inch depth @ crest	
C-9-1		-1.00		2.0 ft Cipolletti weir, 3.375 inch depth @ crest	
C-9-2		-0.94		2.0 ft Cipolletti weir, 3.25 inch depth @ crest	
QCPC-012	**11.66**		12.06	Measurement Rated as "Good"	
QCPC-014	**12.26**		12.06	Measurement Rated as "Good"	
C-19-1		0.00		OFF	
QCPC-016	**11.96**		12.06	Measurement Rated as "Fair"	
C-8 Waste		*0.02*		Return Flow, 10 gpm est. in the field	
C-20		-0.78		352 gpm flow estimated in the field	
QCPC-018	**10.96**		12.82	Measurement Rated as "Fair"	
C Lat Remaining	**10.96**		12.82		



B-7 Sub Lateral Intake to the Study Reach	=	7.94
B-7 Sub Lateral Spill from the Study Reach	=	0.00
B-7 Sub Lateral Turnouts + Flow Remaining	=	-6.17
B-7 Sub Lateral Seepage Loss in the Study Reach	=	1.77 = 22.29%



C Lateral Intake to the Study Reach	=	26.21
C Lateral Spill from the Study Reach	=	0.00
C Lateral Turnouts + Flow Remaining	=	-23.78
C Lateral Seepage Loss in the Study Reach	=	2.42 = 9.25%

COI P.B. Canal - DISCHARGE FLOW MEASUREMENTS

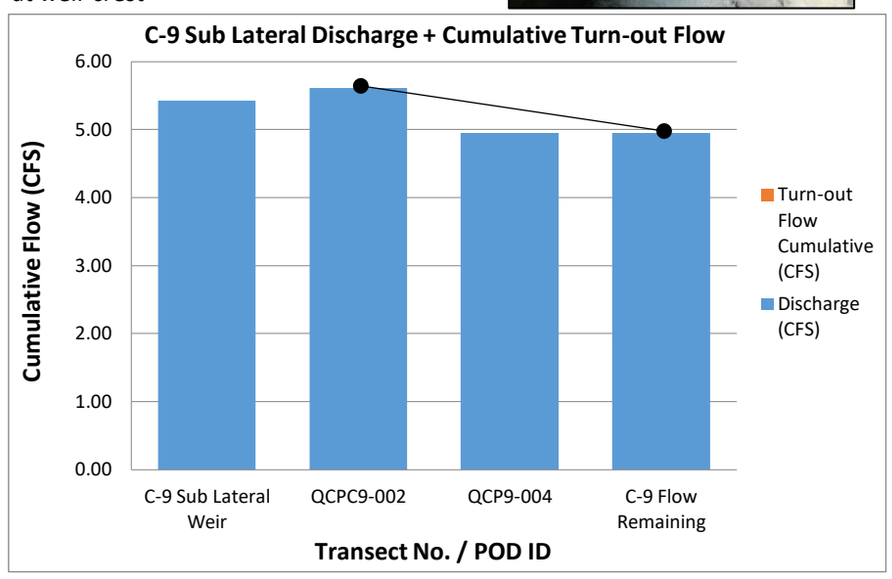
Final
03-08-2017

Transect No. POD #ID	Discharge (CFS)	Turn-out Flow Rate (CFS)	Turn-out Flow Cumulative (CFS)	Comments
C-9 Sub Lateral				
C-9 Sub Lateral Weir	**5.43**		0.00	3.0 ft Cipolletti weir, 8.0 inch depth @ crest
QCPC9-002	**5.61**		0.00	Measurement Rated as "Good"
C-9-3		0.00		OFF
QCP9-004	**4.95**		0.00	Measurement Rated as "Poor"
C-9 Flow Remaining	**4.95**		0.00	
F Lateral (Supplemental Flow Measurements 8-29-16)				
F Lat Ramp Flume	**75.50**		0.00	Ramp Flume, 1.23 feet recorded on staff gage
QCPF-002	**77.64**		0.00	Measurement Rated as "Poor"
F-0		-0.13		60 gpm estimated flow, no weir
QCPF-004	**79.40**		0.13	Measurement Rated as "Poor"
F-1		-5.74		4.0 ft Cipolletti, 6.875 inch depth, weir pool + ditc
F-0-1		-0.13		2.0 ft Cipolletti, submerged weir, 60 gpm est. flov
F-0-2		0.00		OFF
F-2		-0.13		1.0 ft Cipolletti weir, 1.375 inch depth @ crest
F-4		-0.33		2.0 ft Cipolletti weir, 1.625 inch depth @ crest
F-5		-0.26		2.0 ft Cipolletti weir, 1.375 inch depth @ crest
QCPF-006	**74.04**		6.73	Measurement Rated as "Good"
Return Flow		*0.07*		Return Flow, 30 gpm est. in the field
F-7		0.00		OFF
F-7-0		-0.32		1.0 ft Cipolletti weir, 2.5 inch depth @ crest
F-7-1		-0.13		60 gpm estimated flow, no weir
QCPF-008	**68.48**		7.11	Measurement Rated as "Fair"
F-8				Weir submerged, No flow measure recorded
F-9				Weir submerged, No flow measure recorded
F-9-1				Pump, no flow measure recorded
QCPF-010	**69.47**		7.11	Measurement Rated as "Good"
F-10		-1.00		2.0 ft Cipolletti, 3.375 inch depth, submerged
F-10-1		-0.50		2.0 ft Cipolletti, 2.125 inch depth, submerged
F-10-3		-0.64		2.0 ft Cipolletti weir, 2.5 inch depth @ crest
F-11		-2.36		2.0 ft Cipolletti weir, 6.0 inch depth @ crest
H-Lateral		-44.00		10.0 ft Cipolletti weir, 14.625 inch depth
QCPF-012	**24.35**		55.61	Measurement Rated as "Fair"
F-11-Waste				No measurement recorded
H-1 Lateral		-8.60		4 ft Cipolletti, 9.0" depth, silted in, 8-29-16
F-#2	**15.44**		64.21	10 ft Cipolletti weir, 7.25 inch depth @ crest
QCPF-014	**17.28**		64.21	Measurement Rated as "Fair"
F-12-0		-0.02		10 gpm flow estimate made in the field
F-12-1		-0.02		10 gpm flow estimate made in the field
F-13		-0.26		2.0 ft Cipolletti weir, 1.375 inch depth @ crest
QCPF-016	**14.60**		64.52	Measurement Rated as "Good"
F-13-1		-0.23		1.0 ft Cipolletti weir, 2.0 inch depth @ crest
F-14		-1.80		2.0 ft Cipolletti, 5.0 inch depth, submerged
QCPF-018	**12.65**		66.55	Measurement Rated as "Fair"
F-6 Lateral Weir		-9.52		4.0 ft Cipolletti weir, 9.625 inch depth @ crest
F-15-1		-0.40		180 gpm flow estimated, 36 spray heads
F-16		0.00		OFF
F-17		-0.46		2.0 ft Cipolletti weir, 2.0 inch depth @ crest
QCPF-020A	**0.50**		76.93	Measurement Rated as "Poor"
QCPF-020B	**0.57**		76.93	Measurement Rated as "Poor"
F Lat Flow Remaining	**0.50**		76.93	

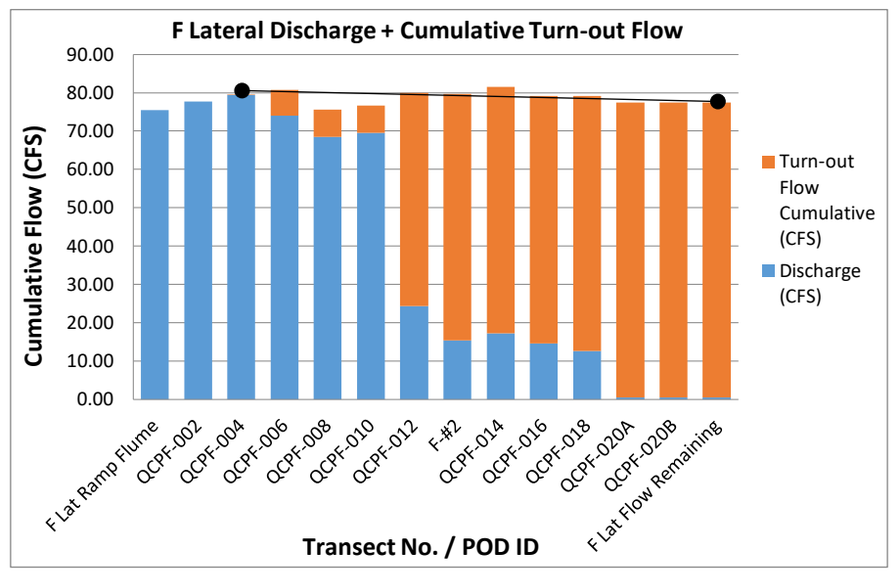
C-9 Sub lateral

F Lateral

C-9 Sub Lateral Weir, high approach velocity, turbulent, non-uniform velocity at weir crest



C-9 Sub Lateral Intake to the Study Reach = 5.61
C-9 Sub Lateral Spill from the Study Reach = 0.00
C-9 Sub Lateral Turnouts + Flow Remaining = -4.95
C-9 Sub Lateral Seepage Loss in the Study Reach = 0.66 = 11.80%

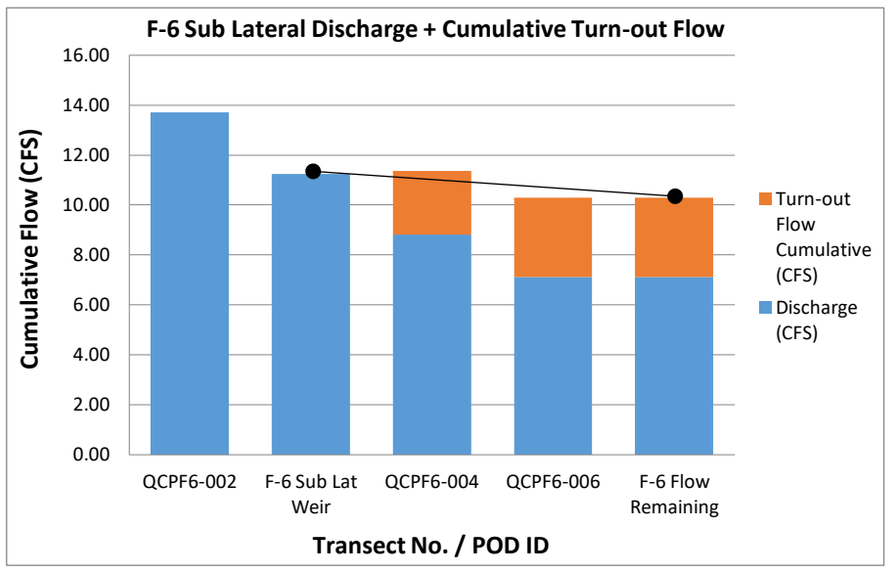


F Lateral Intake to the Study Reach = 79.40
F Lateral Spill from the Study Reach = 0.00
F Lateral Turnouts + Flow Remaining = -77.43
F Lateral Seepage Loss in the Study Reach = 1.97 = 2.48%

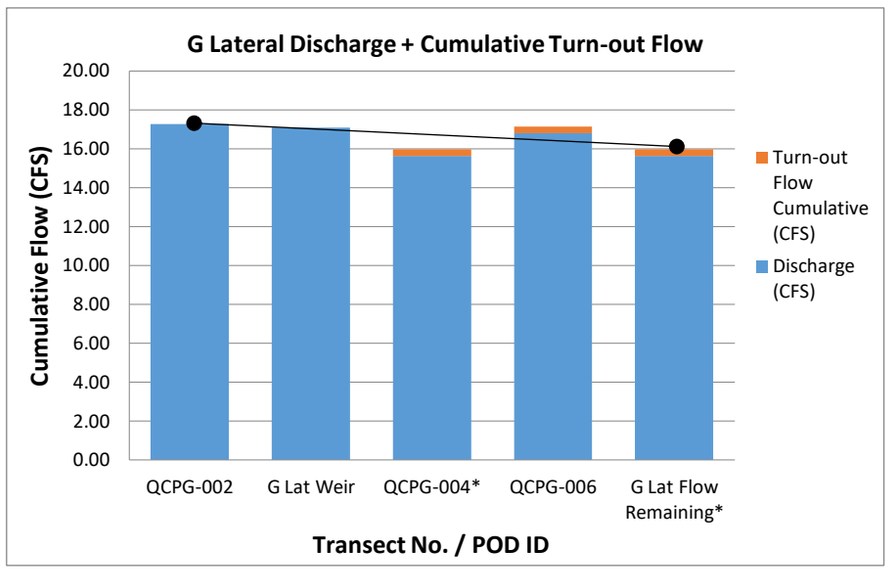
COI P.B. Canal - DISCHARGE FLOW MEASUREMENTS

Final
03-08-2017

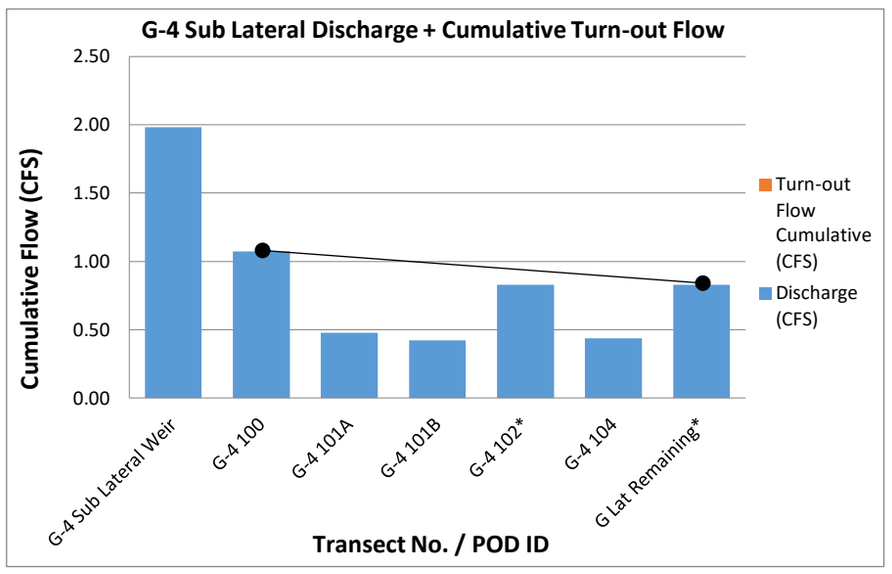
Transect No. POD #ID	Discharge (CFS)	Turn-out Flow Rate (CFS)	Turn-out Flow Cumulative (CFS)	Comments	
F-6 Sub Lateral					F-6 Sub Lateral
QCPF6-002	**13.71**		0.00	Measurement Rated as "Fair"	
F-6 Sub Lat Weir	**11.25**		0.00	4.0 ft Cipolletti, 10.75 inch depth @ crest	
F-6-1		-1.33		597 gpm flow estimated in the field	
F-6-2		-1.22		2.0 ft Cipolletti weir, 3.875 inch depth @ crest	
QCPF6-004	**8.82**		2.55	Measurement Rated as "Fair"	
F-6-4		-0.64		2.0 ft Cipolletti weir, 2.5 inch depth @ crest	
F-6-6				191 gpm flow estimated in the field	
QCPF6-006	**7.11**		3.19	Measurement Rated as "Good"	
F-6 Flow Remaining	**7.11**		3.19		
G Lateral					G Lateral
QCPG-002	**17.27**		0.00	Measurement Rated as "Good"	
G Lat Weir	**17.07**		0.00	8.0 ft Cipolletti weir, 9.0 inch depth @ crest	
G-3		-0.33		2.0 ft Cipolletti weir, 1.625 inch depth @ crest	
QCPG-004*	**15.62**		0.33	Measurement Rated as "Excellent"	
QCPG-006	**16.80**		0.33	Measurement Rated as "Good"	
G Lat Flow Remaining*	**15.62**		0.33		
G-4 Sub Lateral (Supplemental Data 8-31-16)					G-4 Sub Lateral
G-4 Sub Lateral Weir	**1.98**		0.00	4 ft Cipolletti, 3.375 inch depth, weir pool silted +	
G-4 100	**1.07**		0.00	Measurement Rated as "Fair"	
G-4 101A	**0.48**		0.00	Measurement Rated as "Poor"	
G-4 101B	**0.42**		0.00	Measurement Rated as "Poor"	
G-4 102*	**0.83**		0.00	Measurement Rated as "Fair"	
G-4 104	**0.44**		0.00	Measurement Rated as "Poor"	
G Lat Remaining*	**0.83**		0.00		



F-6 Sub Lateral Intake to the Study Reach = 11.25
F-6 Sub Lateral Spill from the Study Reach = 0.00
F-6 Sub Lateral Turnouts + Flow Remaining = -10.30
F-6 Sub Lateral Seepage Loss in the Study Reach = 0.95 = 8.46%



G Lateral Intake to the Study Reach = 17.27
G Lateral Spill from the Study Reach = 0.00
G Lateral Turnouts + Flow Remaining = -15.95
G Lateral Seepage Loss in the Study Reach = 1.31 = 7.60%



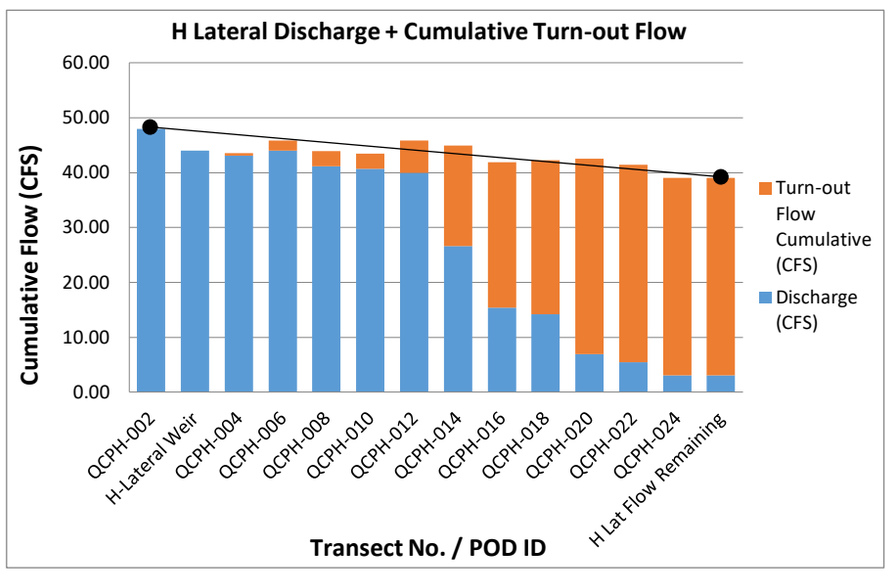
G-4 Sub Lateral Intake to the Study Reach = 1.07
G-4 Sub Lateral Spill from the Study Reach = 0.00
G-4 Sub Lateral Turnouts + Flow Remaining = -0.83
G-4 Sub Lateral Seepage Loss in the Study Reach = 0.24 = 22.66%

COI P.B. Canal - DISCHARGE FLOW MEASUREMENTS

Final
03-08-2017

Transect No. POD #ID	Discharge (CFS)	Turn-out Flow Rate (CFS)	Turn-out Flow Cumulative (CFS)	Comments
H Lateral (Supplemental Flow Measurements 8-29-16)				
QCPH-002	**47.93**		0.00	Measurement Rated as "Fair"
F-12				Weir submerged, No flow measurement recorded
H-Lateral Weir	**44.00**		0.00	10.0 ft Cipolletti weir, 14.625 inch depth
H-0-1		-0.13		1.0 ft Cipolletti weir, 1.375 inch depth @ crest
H-2		-0.33		2.0 ft Cipolletti weir, 1.625 inch depth @ crest
QCPH-004	**43.08**		0.46	Measurement Rated as "Fair"
H-2-1		-1.08		97 sprinklers' recorded, estimated flow
H-2-1		-0.26		4" valve @ siphon, valve full open, no measure re
QCPH-006	**44.00**		1.80	Measurement Rated as "Good"
H-3		0.00		OFF
H-3-A		0.00		OFF
H-3-1		0.00		OFF
H-4		-0.46		2.0 ft Cipolletti weir, 2.0 inch depth @ crest
H-5		-0.46		40 sprinklers' recorded, 200 gpm est. flow
H-6				No weir, no measurement recorded
QCPH-008	**41.17**		2.72	Measurement Rated as "Good"
H-7-0		0.00		OFF
H-7-1		0.00		OFF
H-7-2		0.00		OFF
QCPH-010	**40.72**		2.72	Measurement Rated as "Good"
H-7-2-A		-0.04		4 sprinklers' recorded, 20 gpm flow est. flow
H-7-3		-0.06		2.0 ft Cipolletti weir, 0.5 inch depth @ crest
H-7-4		-0.07		30 gpm estimated flow
H-7-5		0.00		OFF
H-8		-3.05		4.0 ft Cipolletti weir, 4.5 inch depth @ crest
QCPH-012	**39.93**		5.94	Measurement Rated as "Fair"
H-9		0.00		OFF
H-9-1		-0.64		2.0 ft Cipolletti weir, 2.5 inch depth @ crest
H-12		-11.26		6 ft Cipolletti, 8.25" depth, recorded 8-29-16
H-9-2		-0.46		2.0 ft Cipolletti weir, 2.0 inch depth @ crest
H-10		0.00		OFF
H-10-1		0.00		OFF
QCPH-014	**26.58**		18.30	Measurement not rated
H-11		-1.53		2.0 ft Cipolletti weir, 4.5 inch depth @ crest
H-13		0.00		OFF
H-13-0		0.00		OFF
H-13-2		0.00		OFF
H-13-0-1		0.00		OFF
H-14		-6.00		Weir submerged, no flow measure recorded, est. flow based on flow measurement H-14 Sub Lateral on 7-13-16
H-13-1		-0.64		2.0 ft Cipolletti weir, 2.5 inch depth @ crest
QCPH-016	**15.40**		26.47	Measurement not rated
H-13-5				No flow measure recorded
H-15		-1.28		2.0 ft Cipolletti weir, 4.0 inch depth @ crest
H-15-1		-0.30		2.0 ft Cipolletti weir, 1.5 inch depth @ crest
QCPH-018	**14.18**		28.05	Measurement Rated as "Good"
H-16		0.00		OFF
H-16-1				Submerged, no flow measure recorded
H-17		-1.18		4.0 ft Cipolletti weir, 2.375 inch depth @ crest
H-18		-6.38		4 ft Cipolletti, 7.375" depth, recorded 8-29-16
H-19				No flow measure recorded
QCPH-020	**6.93**		35.61	Measurement Rated as "Fair"
H-19-0		0.00		OFF
H-19-1		-0.33		2.0 ft Cipolletti weir, 1.625 inch depth @ crest
H-20-1				Submerged, no flow measure recorded
QCPH-022	**5.45**		35.94	Measurement Rated as "Poor"
QCPH-024	**3.10**		35.94	Measurement Rated as "Fair"
H Lat Flow Remaining	**3.10**		35.94	

H - Lateral

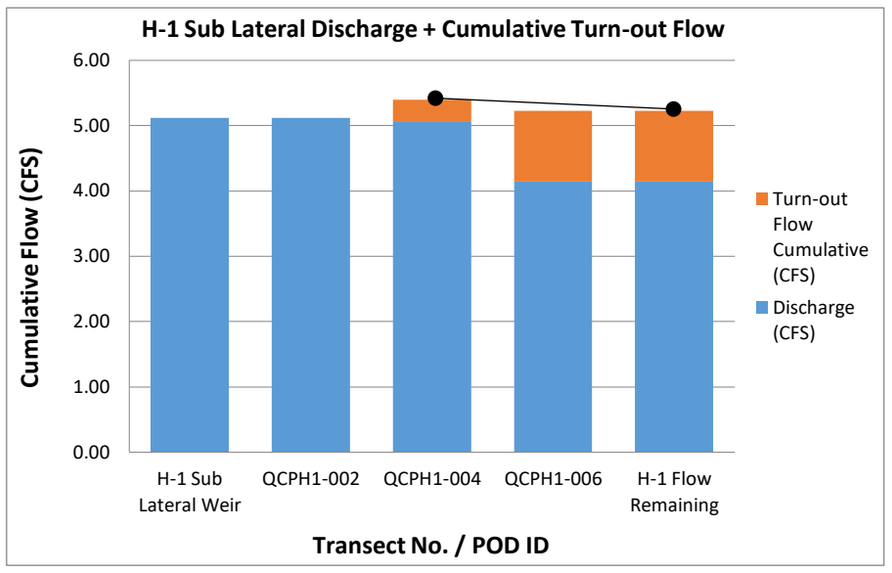


H Lateral Intake to the Study Reach	=	47.93	
H Lateral Spill from the Study Reach	=	0.00	
H Lateral Turnouts + Flow Remaining	=	-39.04	
H Lateral Seepage Loss in the Study Reach	=	8.89	= 18.55%

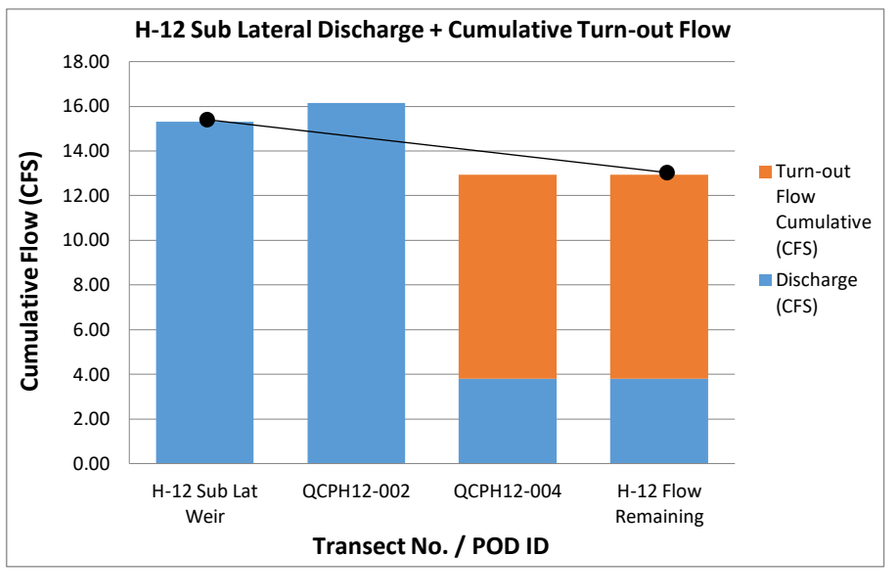
COI P.B. Canal - DISCHARGE FLOW MEASUREMENTS

Final
03-08-2017

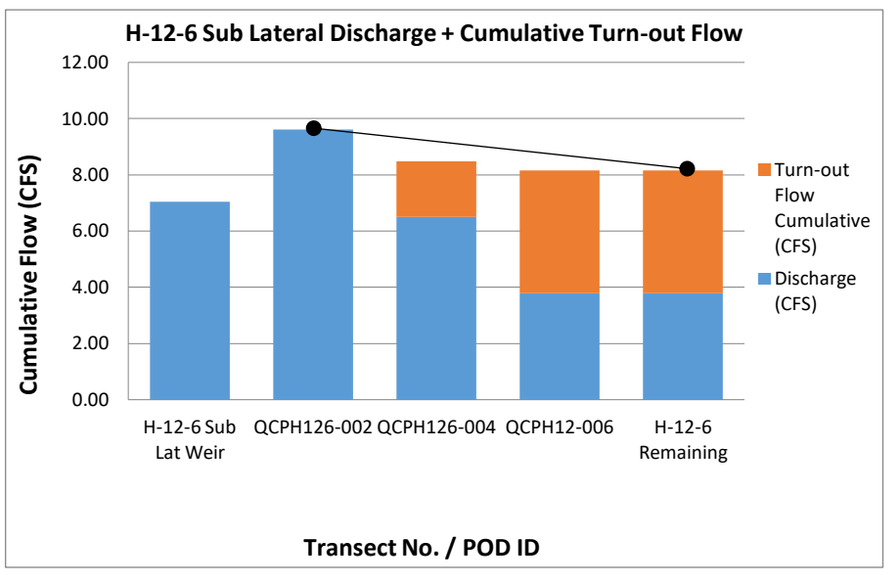
Transect No. POD #ID	Discharge (CFS)	Turn-out Flow Rate (CFS)	Turn-out Flow Cumulative (CFS)	Comments	
H-1 Sub Lateral					H-1 Sub Lateral
H-1 Sub Lateral Weir	**5.12**		0.00	4 ft Cipolletti, 6.375" depth, recorded 7-12-16	
QCPH1-002	**5.12**		0.00	Measurement Rated as "Excellent"	
H-1-1		0.00		OFF	
H-1-2		-0.21		1.0 ft Cipolletti weir, 1.875 inch depth @ crest	
H-1-3		-0.13		2.0 ft Cipolletti weir, 0.875 inch depth @ crest	
QCPH1-004	**5.05**		0.34	Measurement Rated as "Excellent"	
H-1-4		-0.75		1.5 ft Cipolletti weir, 3.375 inch depth @ crest	
H-1-4-1		0.00		OFF	
H-1-5				2.0 ft Cipolletti weir, 2.125 inch depth @ crest	
QCPH1-006	**4.14**		1.09	Measurement Rated as "Fair"	
H-1 Flow Remaining	**4.14**		1.09		
H-12 Sub Lateral					H-12 Sub Lateral
H-12 Sub Lat Weir	**15.31**		0.00	6 ft Cipolletti, 10.125" depth, 7-13-16	
QCPH12-002	**16.16**		0.00	Measurement Rated as "Good"	
H-12-3		-2.09		4.0 ft Cipolletti weir, 3.25 inch depth @ crest	
H-12-5		0.00		OFF	
H-12-5-1		0.00		OFF	
H-12-6		-7.04			
H-12-7					
QCPH12-004	**3.82**		9.13	Measurement Rated as "Good"	
H-12 Flow Remaining	**3.82**		9.13		
H-12-6 Sub Lateral					H-12-6 Sub Lateral
H-12-6 Sub Lat Weir	**7.04**		0.00	4.0 ft Cipolletti, 7.875 inch depth @ crest	
QCPH126-002	**9.61**		0.00	Measurement not rated	
H-12-6-1		-1.98		4.0 ft Cipolletti, 3.375 inch depth @ crest	
H-12-6-1-1		0.00		OFF	
QCPH126-004	**6.51**		1.98	Measurement Rated as "Fair"	
H-12-6-1-3		-1.67		4.0 ft Cipolletti, 3.0 inch depth @ crest	
H-12-6-1-2		-0.73		2.0 ft Cipolletti, 2.75 inch depth @ crest	
QCPH12-006	**3.78**		4.38	Measurement Rated as "Fair"	
H-12-6 Remaining	**3.78**		4.38		
H-14 Sub Lateral				(see F Lateral Discharge + Turnout Data)	H-14 Sub Lateral
H-14 Sub Lat Weir	**6.00**			Weir submerged, estimated flow	
QCPH14-002	**6.42**			Measurement Rated as "Poor"	



H-1 Sub Lateral Intake to the Study Reach = 5.05
H-1 Sub Lateral Spill from the Study Reach = 0.00
H-1 Sub Lateral Turnouts + Flow Remaining = -4.89
H-1 Sub Lateral Seepage Loss in the Study Reach = 0.16 = 3.22%



H-12 Sub Lateral Intake to the Study Reach = 15.31
H-12 Sub Lateral Spill from the Study Reach = 0.00
H-12 Sub Lateral Turnouts + Flow Remaining = -12.95
H-12 Sub Lateral Seepage Loss in the Study Reach = 2.36 = 15.44%



H-12-6 Sub Lateral Intake to the Study Reach = 9.61
H-12-6 Sub Lateral Spill from the Study Reach = 0.00
H-12-6 Sub Lateral Turnouts + Flow Remaining = -8.16
H-12-6 Sub Lateral Seepage Loss in the Study Reach = 1.45 = 15.07%

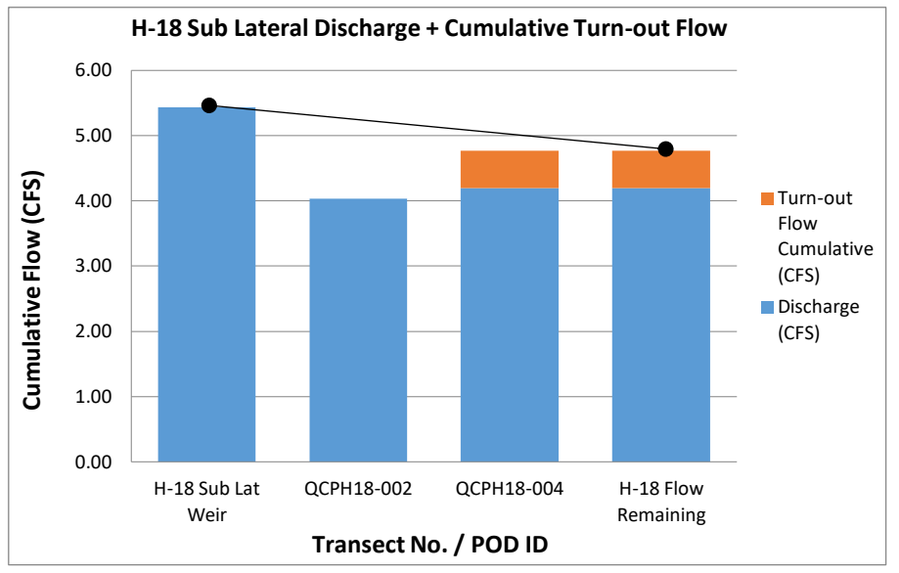
No Leakage Calculations - Turn-out Flow Measure Confirmation only

COI P.B. Canal - DISCHARGE FLOW MEASUREMENTS

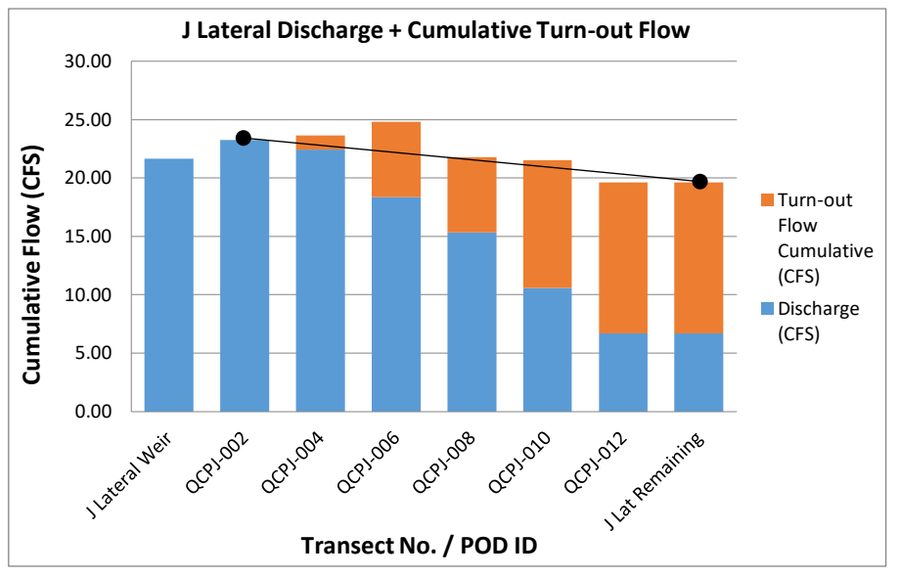
Final
03-08-2017

Transect No. POD #ID	Discharge (CFS)	Turn-out Flow Rate (CFS)	Turn-out Flow Cumulative (CFS)	Comments	
H-18 Sub Lateral					H-18 Sub Lateral
H-18 Sub Lat Weir	**5.43**		0.00	4 ft Cipolletti, 6.625" depth, recorded 7-14-16	
QCPH18-002	**4.03**		0.00	Measurement Rated as "Fair"	
H-18-1		0.00		OFF	
H-18-2		-0.57		258 gpm flow est., 13 turns on 10" Watern	
QCPH18-004	**4.20**		0.57	Measurement Rated as "Poor"	
H-18 Flow Remaining	**4.20**		0.57		
J Lateral					J Lateral
J Lateral Weir	**21.65**		0.00	6.0 ft Cipolletti weir, 12.75 inch depth @ crest	
QCPJ-002	**23.25**		0.00	Measurement Rated as "Good"	
I-3 Waste		-0.46		2.0 ft Cipolletti weir, 2.0 in depth, overtopping	
J-0		-0.08		35 gpm flow estimated in the field	
J-1		-0.64		2.0 ft Cipolletti weir, 2.5 in depth, estimated	
QCPJ-004	**22.44**		1.18	Measurement not rated	
J-2		0.00		OFF	
J-3		-4.97		4.0 ft Cipolletti weir, 6.25 in depth, estimated	
J-4		0.00		OFF	
J-5		-0.30		2.0 ft Cipolletti weir, 1.5 inch depth @ crest	
QCPJ-006	**18.35**		6.45	Measurement Rated as "Good"	
J-5-1				2.0 ft Cipolletti weir, 2.875 inch depth @ crest	
J-7				2.0 ft Cipolletti weir, 3.875 inch depth @ crest	
J-8				2.0 ft Cipolletti weir, 2.25 inch depth @ crest	
QCPJ-008	**15.33**		6.45	Measurement Rated as "Good"	
J-6		-3.82		4.0 ft Cipolletti weir, 5.25 inch depth @ crest	
J-3 Waste Return		0.00		No returning flow	
J-9		-0.37		2.0 ft Cipolletti weir, 1.75 inch depth @ crest	
J-10		-0.27		1.0 ft Cipolletti weir, 2.25 inch depth @ crest	
QCPJ-010	**10.60**		10.91	Measurement Rated as "Fair"	
J-11		-0.30		2.0 ft Cipolletti weir, 1.5 inch depth @ crest	
J-13		-0.28		126 gpm flow estimated in the field	
J-14		-0.46		2.0 ft Cipolletti weir, 2.0 inch depth @ crest	
J-14-1		0.00		OFF	
J-15		0.00		OFF	
J-16		-1.00		2.0 ft Cipolletti weir, 3.375 inch depth @ crest	
QCPJ-012	**6.67**		12.95	Measurement Rated as "Good"	
J Lat Remaining	**6.67**		12.95		
L Lateral					
L Lateral Weir	**10.27**		0.00	4.0 ft Cipolletti weir, 10.125 in depth @ crest	
QCPL-002	**12.00**		0.00	Measurement Rated as "Excellent"	
L-0				No measurement recorded	
L-1		-3.17		4.0 ft Cipolletti weir, 4.625 inch depth @ crest	
L-2		-0.83		2.0 ft Cipolletti weir, 3.0 inch depth @ crest	
L-3		-0.26		2.0 ft Cipolletti weir, 1.375 inch depth @ crest	
L-5		-0.50		0.5 CFS flow estimate, 6 turns on 8" Waterman	
L-6		0.00		OFF	
L-6-1		-0.07		30 gpm flow estimate, 6 sprinklers	
L-6-2		-0.20		90 gpm flow estimate, 18 sprinklers	
QCPL-004	**4.71**		5.03	Measurement Rated as "Good"	
L Lat Flow Remaining	**4.71**		5.03		

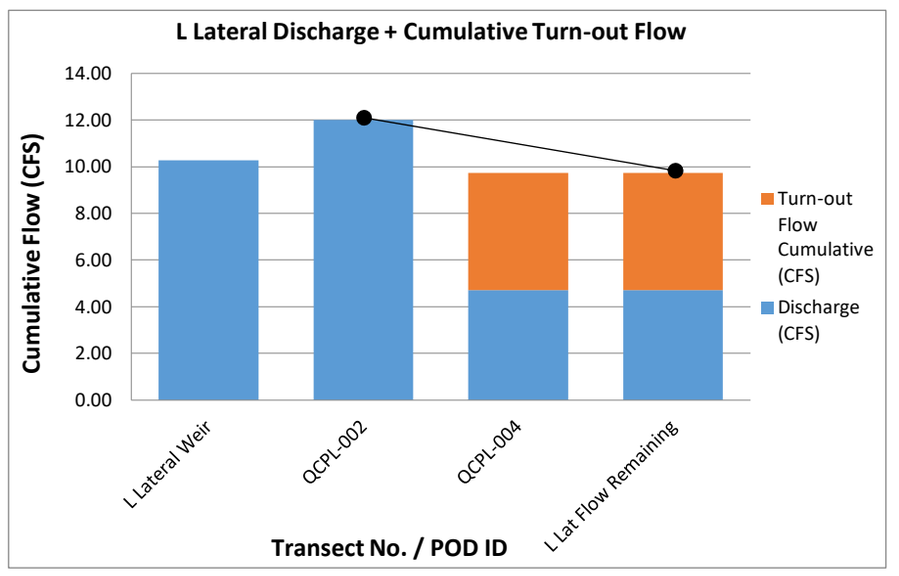
L-Lateral Weir - High approach velocity, 24-inch pool depth, significant edge contraction, non-uniform velocity distribution across the weir



H-18 Sub Lateral Intake to the Study Reach	=	5.43	
H-18 Sub Lateral Spill from the Study Reach	=	0.00	
H-18 Sub Lateral Turnouts + Flow Remaining	=	-4.77	
H-18 Sub Lateral Seepage Loss in the Study Reach	=	0.66	= 12.19%



J Lateral Intake to the Study Reach	=	23.25	
J Lateral Spill from the Study Reach	=	0.00	
J Lateral Turnouts + Flow Remaining	=	-19.62	
J Lateral Seepage Loss in the Study Reach	=	3.63	= 15.60%



L Lateral Intake to the Study Reach	=	12.00	
L Lateral Spill from the Study Reach	=	0.00	
L Lateral Turnouts + Flow Remaining	=	-9.74	
L Lateral Seepage Loss in the Study Reach	=	2.26	= 18.84%

APPENDIX A
TABULATED SEEPAGE LOSS DATA

NF = Not Flowing
NM = Not Measurable

Loss
Gain

CFS = Flow based on Weir Calculation
Acres = Est. CFS based on value in K2

Est. GPM For Deliveries	6

Mile			Acres W/R	Est. CFS			Total (Q)	Loss / Gain	% of Flow
5/6/16									
Point 1	**1.5**						**349.0**		
Delivery	COC -04	CFS		0.15					
Delivery	COC -07	Acres	1			NF			
Delivery	COC -08	Acres	1.5	0.02	NM				
Delivery	COC-012	Acres	1		NM	NF			
Delivery	COC-014	Acres	0.58	0.01	NM				
Arnold Drainage		Inflow			NM	NF			
Delivery	A-1	CFS		0.23					
		Total CFS		**0.41**					
Point 2	**4.75**						**343.0**	**-5.62**	**-1.6%**
City Drainage		CFS		-0.25	Intake				
Delivery	COC-1	Acres	1.6		NM	NF			
Delivery	COC-1-1	Acres	2.5		NM	NF			
Delivery	COC-2-1	Acres	13	0.17	NM				
Delivery	COC-3-0-2	Acres	20.9		NM	NF			
Delivery	COC-3-1	Acres	25.35		NM	NF			
Delivery	COC-3-3	Acres	22	0.29	NM				
Delivery	A-Lateral	CFS		33.07					
Delivery	COC-6	CFS		0.11					
Delivery	COC-6-1	CFS		0.74					
Delivery	COC-7	CFS		0.26					
Delivery	COC-7-1	CFS		0.95					
Delivery	COC-7-2	Acres	5			NF			
Delivery	COC-7-3	Acres	1		NM	NF			
		Total CFS		**35.35**					
Point 3	**7.75**						**307.0**	**-0.62**	**-0.2%**
5/10/16									
Point 3 [R]	**7.75**						**300.5**		
Delivery	COC-7-4	Acres	5		NM (pump)	NF			
Delivery	COC-9	Acres	4		NM	NF			
Delivery	COC-8	CFS		0.27					
Delivery	COC-10	Acres	89.44	1.20	NM (pump)				
Delivery	COC-10-1	CFS		0.08					
Delivery	COC-11	Acres	1.95	0.03	NM				
Delivery	COC-12	Acres	9.6	0.13	NM				
Delivery	COC-13	CFS		0.80					
Delivery	B-Lateral	CFS		14.23					
Delivery	B-1	Acres	4	0.05					
Delivery	B-1-0	Acres	3.4	0.05					
Delivery	B-1-1	CFS		1.36					
Delivery	COC-14	Acres	12.1			NF			
Delivery	COC-14-1	CFS		0.46					
Delivery	COC-15	Acres	24.2		NM	NF			
Delivery	C-Lateral	CFS		15.35					
Delivery	COC-16	Acres	12			NF			
Delivery	C-3	CFS		1.48					
Delivery	COC-18	CFS		1.30					
		Total CFS		**36.78**					
Point 4	**11.1**						**265.0**	**1.28**	**0.5%**
Delivery	COC-18-0	Acres	5.5			NF			
Delivery	COC-19	CFS		0.19					
Delivery	COC-18-2	Acres	5	0.07	NM				
Delivery	C-4	Acres	50.22	0.67	NM				
Delivery	C-5	CFS		1.61					
Delivery	COC-20	Acres	9	0.12	NM				
Delivery	D-Lateral	CFS		11.78					
Delivery	COC-21	Acres	10			NF			
Delivery	COC-22	CFS		0.19					
Delivery	D-3	CFS		6.14					
Delivery	COC-22-1	CFS		0.13					
Delivery	COC-22-2	Acres	4.5			NF			
Delivery	D-1	CFS		6.82					
Delivery	COC-22-3	Acres				NF			
		Total CFS		**27.72**					
Point 5	**13**						**241.82**	**4.54**	**1.9%**
5/11/16									
Point 5[R]	**13**						**239.07**		
Delivery	D-4	CFS		4.45					
Delivery	COC-23	Acres	9.91	0.13					
Delivery	COC-23-0	Acres	2.7			NF			
Delivery	COC-23-1	CFS		0.11					
Delivery	COC-23-2	CFS		0.13					
Delivery	COC-24	Acres	30.8			NF			
Delivery	E-2	CFS		2.12					
Delivery	COC-25	CFS		0.34					
		Total CFS		**7.28**					
Point 6	**15**						**231.14**	**-0.65**	**-0.3%**
Delivery	F-1	CFS		0.92					
Delivery	COC-26-1	CFS		0.64					
Delivery	F-2	CFS		4.91					
Delivery	COC-27	CFS		0.50					
Delivery	COC-28	Acres	25.6	0.34	didn't measure				
Delivery	COC-29	Acres	23		didn't measure	NF			
Delivery	COC-30	CFS		0.55					
Delivery	COC-31-1	CFS		0.08					
Delivery	COC-31-2	CFS		0.08					
Delivery	COC-32	Acres	15.1			NF			
Delivery	COC-33	CFS		0.55					
Delivery	H Lateral	CFS		9.82					
Delivery	H-2	CFS		2.76					
		Total CFS		**21.15**					

Point 7		**18.5**						**193.10**	**-16.89**	**-8.7%**
5/12/16										
Point 7[R]		**18.5**						**203.95**		
	Delivery	COC-33-1	CFS		0.19					
	Delivery	COC-34	Acres	11		NF				
	Delivery	COC-35	CFS		0.3					
	Delivery	I-Lateral	CFS		44.88	NF				
			Total CFS		**45.37**					
Point 8		**22.75**						**151.35**	**-7.23**	**-4.8%**
	Delivery	COC-35-1	Acres	4	0.05	didn't measure				
	Delivery	H-#3	CFS		-1.00	INTAKE				
	Delivery	COC-35-2	Acres	4	NM		NF			
	Delivery	COC-37	Acres	17			NF			
	Delivery	COC-36	Acres	36	0.48					
	Delivery	COC-37-1	CFS	25	0.33					
	Delivery	COC-38-1	CFS		0.64					
			Total CFS		**0.51**					
Point 9		**25.25**						**147.73**	**-3.11**	**-2.1%**
	Delivery	COC-38-2	Acres	30	0.40	Partial flow				
	Delivery	COC-38-3	Acres	2.7	0.04					
	Delivery	COC-38-4	Acres	3	0.04					
	Delivery	COC-38-5	CFS		0.15					
	Delivery	COC-38-6	Acres	5	0.07					
	Delivery	COC-39	CFS		0.55					
	INTAKE	I-3#3	CFS		-1.00					
	Delivery	COC-41-1	Acres	34			NF			
	Delivery	COC-41-2	CFS		0.84					
	Delivery	COC-41-4	CFS		0.34					
	Delivery	J-Lateral	CFS		4.76					
	Delivery	PBSP			Trickle					
	Delivery	K-0	CFS		0.57					
	Delivery	K-1	CFS		0.16					
	Delivery	K-2-1	CFS		0.69					
	Delivery	K-3-1	CFS		0.23					
	Delivery	K-3-2	CFS		1.68					
	Delivery	K-3-4	Acres	RW			NF			
	Delivery	K-3-5	CFS		0.79					
	Delivery	K-3-6	Acres	30			NF			
	Delivery	K-4	CFS		0.26					
	Delivery	K-4-0	CFS		0.13					
			Total CFS		**10.69**					
Point 10		**31.5**						**125**	**-12.04**	**-9.6%**
5/18/16										
Point 10[R]		**31.5**						**159.19**		
	Delivery	K-4-1	Acres	16.8	0.22					
	Delivery	K-4-1-1	Acres	60.46	0.81					
	Delivery	K-4-2	CFS		0.42					
	Lateral	K-4-3	CFS		0.23					
	Delivery	K-4-4	CFS		0.50					
	Delivery	K-5	CFS		0.08					
	Delivery	K-5-0	Acres	44.8	0.60					
	Delivery	K-5-1	CFS		1.85					
	Delivery	K-5-2	CFS		0.42					
	Delivery	K-5-3	Acres	179.94	2.41					
	Delivery	K-5-4	Acres	32.25	0.43					
	Delivery	K-5-6	Acres	253			NF			
	Delivery	K-6-1	CFS		1.55					
	Delivery	K-6-4	Acres	155.19	2.07					
	Delivery	K-7-1	CFS		0.84					
	Delivery	K-7-2	CFS		0.38					
	Delivery	K-7-3	Acres	143.26	1.92					
	Delivery	K-7-4	Acres	64.6	0.86					
	Delivery	K-7-5	Acres	1	0.01					
	Delivery	K-8-1	CFS		1.30					
	Delivery	K-8-2	CFS		0.46					
	Delivery	K-8-3	Acres	36.27	0.48					
	Delivery	K-8-4	CFS		0.74					
	Delivery	K-8-5	CFS		0.50					
	Delivery	K-9-1	CFS		0.34					
	Delivery	K-9-2	CFS		0.46					
	Delivery	K-9-4	Acres	7	0.06					
	Delivery	K-10	CFS		1.28					
			Total CFS		**21.23**					
Point 11		**34.5**						**135.47**	**-2.49**	**-1.8%**

NF = Not Flowing
NM = Not Measurable

Loss
Gain

CFS = Flow based on Weir Calculation
Acres = Est. CFS based on value in K2

Est. GPM For Deliveries	6

	Mile			Acres W/R	Est. CFS			Total (Q)	Loss / Gain	% of Flow
9/2/15										
State Guage						**457.07**				
Point 1	**0.5**							**453.7**		
Point 2	**0.75**							**501.1**	**47.4**	**9%**
Point 3	**2**							**442.3**		
	Delivery	A-4-3	CFS		0.46	2" over 2' weir				
	Delivery	A-4-2	Acres	18.5	0.25	NM				
	Delivery	A-4	CFS		6.54	7.5" over 4' weir				
	Delivery	PBC-3	Acres	67.62	0.91	Avion - no idea if running				
			Total CFS		**7.25**					
Point 4	**3**							**425.5**	**-9.5**	**-2%**
9/3/15										
State Guage						**446.4**		**Day Over Change**		**-11**
Point 5	**6.5**							**395.4**		
	Robinsons	Industrial			0.00	NM	NF			
			Total CFS		**0.00**					
Point 6	**7.5**							**368.9**	**-26.484**	**-7.2%**
9/10/15										
State Guage						**404.8**				**-42**
Point 5[R][R]	**6.5**							**360.9**		
	Robinsons	Industrial			0.00	NM	NF			
			Total CFS		**0.00**					
Point 6 [R][R]	**7.5**							**346.4**	**-14.49**	**-4.2%**
	Delivery	PBC 4-1 and 4-2	Acres	19.5	0.26	NM (1.25" over 2' Sub.)				
	Delivery	A-16	CFS		17.78	9.25" over 8'				
			Total CFS		**18.04**					
Point 7	**8.75**							**349.1**	**20.70**	**5.9%**
	Delivery	A-18	Acres	13.28	0.18	NM (1.25" over 2' Sub.)				
	Delivery	PBC 4-2-1			0.00		NF			
	Delivery	PBC 4-3			0.00		NF			
	Delivery	PBC 5	CFS		0.33	1.625" over 2'				
	Delivery	PBC 5-1	trickle	0	0.00	NM				
			Total CFS		**0.51**					
Point 8	**10.75**							**321.40**	**-27.16**	**-8.5%**
	Delivery	PBC 7	CFS		0.00	4 3/8" ver 4				
	Delivery	PBC 6-1		0	0.00	NM	NF			
	Lateral	A-21	CFS		16.71	8 7/8" over 8'				
	Delivery	PBC 6-1	Acres	0	0.00	NM	NF			
			Total CFS		**16.71**					
Point 9	**12.25**							**309.768**	**5.08**	**1.6%**
	Delivery	PBC 8-1			0.00		NF			
	Delivery	PBC 8-2			0.00		NF			
	Delivery	PBC 8-3			0.00		NF			
	Delivery	PBC 9			0.00		NF			
	Lateral	B-2	Acres	690	9.22	NM Submerged		5.110240699		
	Lateral	B	CFS		39.41			39.4127597		
	Delivery	PBC 11			0.00		NF			
	Delivery	PBC 10	Acres	13.50	0.18	NM Weeds				
	Delivery	B-1	CFS		1.67	3" over 4'				
	Delivery	PBC 11-1	Acres	3	0.04	NM Pump (No sprinklers seen)				
	Delivery	PBC 11-1-1	CFS		1.60	4 5/8" over 2'				
	Delivery	PBC 11-2	CFS		0.83	3" over 2'				
	Delivery	PBC 11-3	Acres	5	0.07					
	Delivery	PBC 12	Acres	18.15	0.24					
	Delivery	PBC 13	CFS			2 1/8" over 2'				
	Delivery	PBC 15			0.00		NF			
	Delivery	PBC 14			0.00		NF			
	Lateral	C-1	Acres	42.37	0.57					
	Lateral	C	CFS		12.57	8 7/8" over 6'				
			Total CFS		**66.40**					
Point 10	**15.8**							**211.78**	**-31.58**	**-14.9%**
9/11/15										
State gauge						**394.09**		**Day Over Change**		**-11**
Point 10[R]	**15.75**							**196.479**		
	Delivery				0.00	NF				
			Total CFS		**0.00**					
Point 11[R]	**16.5**							**197.302**	**0.82**	**0.4%**
	Delivery			0		NF				
			Total CFS		**0.00**					
Point 12	**17.4**							**197.408**	**0.11**	**0.1%**

NF	= Not Flowing	Loss	CFS = Flow based on Weir Calculation	Est. GPM For Deliveries	6
NM	= Not Measurable	Gain	Acres = Est. CFS based on value in K2		

Mile				Acres W/R	Est. CFS			Total (Q)	Loss / Gain	% of Flow
9/2/15										
State Guage						**457.07**				
Point 1	**0.5**							**453.7**		
Point 2	**0.75**							**501.1**	**47.4**	**9%**
Point 3	**2**							**442.3**		
	Delivery	A-4-3	CFS		0.46	2" over 2' weir				
	Delivery	A-4-2	Acres	18.5	0.25	NM				
	Delivery	A-4	CFS		6.54	7.5" over 4' weir				
	Delivery	PBC-3	Acres	67.62	0.91	Avion - no idea if running				
			Total CFS		**7.25**					
Point 4	**3**							**425.5**	**-9.5**	**-2%**
9/3/15										
State Guage						**446.4**		**Day Over Change**		**-11**
Point 5	**6.5**							**395.4**		
	Robinsons	Industrial			0.00	NM	NF			
			Total CFS		**0.00**					
Point 6	**7.5**							**368.9**	**-26.484**	**-7.2%**
9/10/15										
State Guage						**404.8**				**-42**
Point 5[R][R]	**6.5**							**360.9**		
	Robinsons	Industrial			0.00	NM	NF			
			Total CFS		**0.00**					
Point 6 [R][R]	**7.5**							**346.4**	**-14.49**	**-4.2%**
	Delivery	PBC 4-1 and 4-2	Acres	19.5	0.26	NM (1.25" over 2' Sub.)				
	Delivery	A-16	CFS		17.78	9.25" over 8'				
			Total CFS		**18.04**					
Point 7	**8.75**							**349.1**	**20.70**	**5.9%**
	Delivery	A-18	Acres	13.28	0.18	NM (1.25" over 2' Sub.)				
	Delivery	PBC 4-2-1			0.00		NF			
	Delivery	PBC 4-3			0.00		NF			
	Delivery	PBC 5	CFS		0.33	1.625" over 2'				
	Delivery	PBC 5-1	trickle	0	0.00	NM				
			Total CFS		**0.51**					
Point 8	**10.75**							**321.40**	**-27.16**	**-8.5%**
	Delivery	PBC 7	CFS		0.00	4 3/8" ver 4				
	Delivery	PBC 6-1		0	0.00	NM	NF			
	Lateral	A-21	CFS		16.71	8 7/8" over 8'				
	Delivery	PBC 6-1	Acres	0	0.00	NM	NF			
			Total CFS		**16.71**					
Point 9	**12.25**							**309.768**	**5.08**	**1.6%**
	Delivery	PBC 8-1			0.00		NF			
	Delivery	PBC 8-2			0.00		NF			
	Delivery	PBC 8-3			0.00		NF			
	Delivery	PBC 9			0.00		NF			
	Lateral	B-2	Acres	690	9.22	NM Submerged		5.110241		
	Lateral	B	CFS		39.41			39.41276		
	Delivery	PBC 11			0.00		NF			
	Delivery	PBC 10	Acres	13.50	0.18	NM Weeds				
	Delivery	B-1	CFS		1.67	3" over 4'				
	Delivery	PBC 11-1	Acres	3	0.04	NM Pump (No sprinklers seen)				
	Delivery	PBC 11-1-1	CFS		1.60	4 5/8" over 2'				
	Delivery	PBC 11-2	CFS		0.83	3" over 2'				
	Delivery	PBC 11-3	Acres	5	0.07					
	Delivery	PBC 12	Acres	18.15	0.24					
	Delivery	PBC 13	CFS			2 1/8" over 2'				
	Delivery	PBC 15			0.00		NF			
	Delivery	PBC 14			0.00		NF			
	Lateral	C-1	Acres	42.37	0.57					
	Lateral	C	CFS		12.57	8 7/8" over 6'				
			Total CFS		**66.40**					
Point 10	**15.8**							**211.78**	**-31.58**	**-14.9%**
9/11/15										
State gauge						**394.09**		**Day Over Change**		**-11**
Point 10[R]	**15.75**							**196.479**		
	Delivery				0.00	NF				
			Total CFS		**0.00**					
Point 11[R]	**16.5**							**197.302**	**0.82**	**0.4%**
	Delivery			0		NF				
			Total CFS		**0.00**					
Point 12	**17.4**							**197.408**	**0.11**	**0.1%**

ATTACHMENT 5: LETTERS OF SUPPORT

CENTRAL OREGON Irrigation DISTRICT Since 1918

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

April 12, 2021

Re: Smith Rock Irrigation Modernization & Conservation J and L Laterals

Dear Grant Review Team:

Central Oregon Irrigation District (COID)was instrumental in settling the Deschutes Basin in the early 1900's through delivery of water for agriculture. As a District we are committed to modernizing the system that has served the area for over a hundred years. Through our modernization plan we are currently constructing the Federally funded 30-million-dollar Smith Rock King Way (SRWK) Piping Project that will be completed April of 2022. Piping COID's main canal opens up opportunity for piping smaller laterals and on farm conservation.

We strongly encourage you to support the Deschutes River Conservancy and Central Oregon Irrigation District Water Projects and Loans grant proposal to implement the J and L lateral piping and water conservation project. The J and L Lateral projects directly connect to the SRKW project and will maximize current and future project conservation as well as expedite the benefits of on-demand pressurized water to COID patrons. Water conservation projects are critical to meet basin-wide goals as detailed in the HCP and the Upper Deschutes Basin Study.

The recently completed Deschutes Basin Study identified significant water conservation savings within private lateral distribution systems and associated on-farm parcels. This piping work will complement the on-farm work concurrently being developed, resulting in additional water savings to help meet Deschutes Basin water demands and water management goals.

Thank you for your consideration.

Shon Rae

Deputy Managing Director

NORTH UNIT IRRIGATION DISTRICT

2024 NW Beech Street
Madras, Oregon 97741

(541) 475-3625
(541) 475-3652
Fax (541) 475-3905
nuid@northunitid.com

RE: Smith Rock Irrigation Modernization and Conservation – J and L Laterals

North Unit Irrigation District (NUID) is the second largest irrigation district in the state of Oregon and the junior most water right holder on the Deschutes River. In recent years, NUID has faced devastating water shortages and ongoing drought conditions. We believe these shortages, in part, are resolvable through conservation projects and targeted technical support to the communities served by Deschutes Basin irrigation districts, including projects like the Smith Rock Irrigation Modernization and Conservation – J and L Laterals Project.

NUID strongly supports the Deschutes River Conservancy and Central Oregon Irrigation District's (COID) Water Projects and Loans grant proposal to implement the J and L Lateral Piping and Water Conservation Project. Studies have identified significant water conservation savings within COID's lateral distribution systems and associated farm parcels. The piping of COID's J and L Laterals will, as I understand, provide pressurized irrigation delivery systems that will further incentivize COID water users to make on-farm irrigation efficiency improvements. Furthermore, the benefits of on-demand pressurized water to COID patrons will also create water savings efficiencies that can be shared with NUID to meet basin-wide goals. Specifically, COID will transfer 100% of water conserved through this Project (estimated at 2 cfs per COID's System Improvement Plan) to NUID to improve NUID's water right reliability, which is critical given NUID holds the most junior live flow irrigation water rights on the Deschutes. In exchange, NUID will legally protect a volume of water that is equivalent to the 2 cfs of conserved water in the Upper Deschutes River via a winter instream lease of its storage right in Wickiup Reservoir (Certificate 51229), enhancing instream flows for the ESA-listed Oregon spotted frog. This pathway is a proven process with NUID's instream leases IL-1770 and IL-1837, and provides for the protection of winter releases of stored water for instream purposes. The U.S. Bureau of Reclamation has provided approval for these leases as the storage facility owner for the water right being leased instream to Oregon Water Resources Department.

NUID and COID have worked closely in recent years to develop tools that can create opportunities for development and management of water within the basin. The J and L Lateral Piping and Water Conservation Project is directly in-line with NUID and COID's goals, and the findings of the Upper Deschutes River Basin Study, the priorities of the Deschutes Basin Water Collaborative, and the direction of numerous basin partners trying to provide a reliable water supply for agriculture while also improving streamflow for fish and wildlife.

Sincerely,

Mike Britton
Manager

"Conserve Water – The Supply is Limited"

THE CONFEDERATED TRIBES OF THE WARM SPRINGS RESERVATION OF OREGON

Warm Springs, Oregon 97761 / 541-553-1161

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301

April 19, 2021

Re: Smith Rock Irrigation Modernization & Conservation J and L Laterals

Dear Grant Review Team:

The Branch of Natural Resources with the Confederated Tribes of Warm Springs supports the Deschutes River Conservancy's and Central Oregon Irrigation District's Water Projects and Loans grant proposal to implement the J and L piping and water conservation project in the Smith Rock/King Way project area of Central Oregon Irrigation District (COID). COID's J and L Laterals connect directly to the Pilot Butte Canal which is one of two main canals that serve the Central Oregon area. COID will pipe these laterals helping to expedite the benefits of on-demand pressurized water to COID patrons and enable water savings to be moved to other users and uses to meet basin-wide goals as detailed in the Habitat Conservation Plan and the Upper Deschutes Basin Study.

The recently completed Deschutes Basin Study identified significant water conservation savings within private lateral distribution systems and associated on-farm parcels. This piping work will complement the on-farm work concurrently being developed, resulting in additional water savings to help meet Deschutes Basin water demands and water management goals.

Thank you for your consideration.

Sincerely,

Robert A. Brunoe

Robert A. Brunoe
General Manager, Branch of Natural Resources, Tribal Historic Preservation Officer
Confederated Tribes of Warm Springs

April 21, 2021

To: Oregon Water Resources Department
Via email

Re: Comment Supporting COID Smith Rock Irrigation Modernization & Conservation J and L Lateral proposal

The Wild River Owners Association (WROA) represents approximately 200 homeowners who live on or near the Deschutes River about 8 miles below Wickiup Dam. Our development straddles the Deschutes just north of Burgess Road at Pringle Falls in Deschutes County. As a riverfront community we are directly affected by river flows, water quality, erosion and fish and wildlife habitat. These issues are directly impacted by irrigation district water operations.

COID's J and L laterals connect directly to the Pilot Butte Canal which is one of two main canals that serve the Central Oregon area. COID will pipe these laterals helping to expedite the benefits of on-demand pressurized water to COID patrons and enable water savings to be moved to other users to meet basin-wide goals as detailed in the HCP and the Upper Deschutes Basin Study.

WROA strongly supports COID's proposal. We believe that irrigation modernization will materially and positively impact those issues mentioned above, benefiting the residents of WROA, other communities on the river, the Central Oregon farming industry, the general public and the fish and wildlife that depend on the river.

We also encourage COID to continue exploring other water conservation approaches including water leasing and additional on-farm conservation measures.

We appreciate your consideration and respectfully request that COID's Proposal and request for funding be moved forward as expeditiously as possible.

Sincerely,

Mike Taylor
River Conservation Representative
Wild River Owners Association
53496 Wild River Way
La Pine, OR 97739

ATTACHMENT 6: PROJECT COST ESTIMATES

J Lateral Piping Project - to Wilcox

Central Oregon Irrigation District

Reconnaissance-Level Construction Cost Estimate 4/26/21

Feature	DR or PR	Dia. (In)	Length (ft)	Unit	$/Unit	Total Cost
J-LAT TO WILCOX						
PIPE	26	24	200	LF	$198	$39,585
PIPE	26	20	750	LF	$137	$103,082
PIPE	21	20	1,950	LF	$169	$329,015
PIPE	21	18	2,020	LF	$137	$276,437
PIPE	21	12	2,584	LF	$75	$193,154
PIPE	19	12	946	LF	$81	$76,153
PRV		20	1	LS	$200,000	$200,000
TURNOUTS			6		$10,000	$60,000
	SUBTOTAL					$1,277,426
	ENGINEERING, CM, SURVEY			9%		$114,968
	Contractor Markup			18%		$229,937
	TOTAL					**$1,622,331**

L Lateral Piping Project

Central Oregon Irrigation District

Reconnaissance-Level Construction Cost Estimate 4/23/21

Feature	DR or PR	Dia. (In)	Length (ft)	Unit	$/Unit	Total Cost
PIPE	21	24	1,660	LF	$243	$402,705
PIPE	21	18	2,780	LF	$136	$379,286
PIPE	15.5	14	4,378	LF	$110	$480,378
PIPE	15.5	10	440	LF	$75	$32,890
PIPE	21	8	510	LF	$52	$26,393
PIPE	21	4	600	LF	$46	$27,600
L-1 PIPE	21	16	1,610	LF	$108	$173,625
L-1 PIPE	19	8	2,040	LF	$52	$105,570
L-2 PIPE	21	6	440	LF	$52	$22,770
L-10 Pipe	21	12	1,090	LF	$75	$81,478
Turnouts			15	EA	$10,000	$150,000
	SUBTOTAL					$1,882,695
	ENGINEERING, CM, SURVEY			LS		$150,000
	Contractor Markup			18%		$338,885
	TOTAL					**$2,371,580**

ATTACHMENT 7: NUID/BOR CONTRACT

UNITED STATES

DEPARTMENT

OF THE INTERIOR

Bureau of Reclamation

Amendatory Repayment Contract

Between

THE UNITED STATES OF AMERICA

AND THE NORTH UNIT IRRIGATION DISTRICT

Deschutes Project, Oregon

UNITED STATES

DEPARTMENT OF THE INTERIOR

Bureau of Reclamation

Deschutes Project, Oregon

AMENDATORY REPAYMENT CONTRACT

THIS AMENDATORY CONTRACT, made this 13th day of February, 1954, by and between THE UNITED STATES OF AMERICA, hereinafter called the United States, acting through the Secretary of the Interior, and pursuant to the Federal Reclamation Laws, and the NORTH UNIT IRRIGATION DISTRICT (formerly known as the Jefferson Water Conservancy District), an irrigation district organized and existing under and by virtue of the laws of the State of Oregon, hereinafter referred to as the District,

Explanatory Recitals

WITNESSETH, THAT:

2. WHEREAS, under the authority of the Federal Reclamation Laws, the United States is constructing the irrigation project in the State of Oregon, known as the Deschutes Project; and

3. WHEREAS, the United States and the District, acting pursuant to the Federal Reclamation Laws, entered into contracts obligating the District to repay to the United States the costs of constructing the North Unit of the project; and

4. WHEREAS, the District, as the duly authorized representative of the water users, desires to enter into an amendatory contract to secure the benefits of the Reclamation Project Act of 1939 (53 Stat. 1187) and to supersede the existing contracts; and

5. WHEREAS, the Secretary has determined that in his judgment the provisions of this amendatory contract will provide a fair and equitable treatment of the repayment problem of the water users of the Deschutes Project and will be in keeping with the general purposes of the Reclamation Project Act of 1939;

NOW, THEREFORE, in consideration of the mutual and dependent stipulations and covenants herein contained, it is mutually agreed by and between the parties hereto as follows:

Definitions

6. The following terms hereinafter used in this contract shall have the following respective meanings:

(a) "Secretary" shall mean the Secretary of the Interior or his duly authorized representative.

(b) "Federal Reclamation Laws" shall mean the Act of June 17, 1902 (32 Stat. 388) and all acts amendatory thereof or supplementary thereto, including without limitation by this enumeration the Reclamation Project Act of 1939 (53 Stat. 1187) and the act authorizing the execution of this contract.

(c) "Reserved works" shall mean Wickiup Dam and Reservoir located in townships 21 and 22 south, ranges 8 and 9 east, Willamette Meridian.

(d) "Transferred works" shall mean all of the irrigation works, exclusive of the reserved works, in connection with the project, all or any part of which may hereafter be transferred to the District for operation and maintenance.

(e) "Government-District contracts" shall mean, collectively, the contract between the District and the United States dated January 4, 1938, as supplemented and amended by the contracts dated June 5, 1945, September 5, 1945, and October 26, 1949.

(f) "Project" shall mean all the lands within the jurisdiction of the District and all the irrigation works constructed or to be constructed to serve those lands, whether constructed by the United States or otherwise.

Contract Scope and Term

7. This contract supercedes and takes the place of the Government-District contacts. Except as to provisions of the Government-District contracts which have been fully executed prior to the date of this contract, which shall remain unaffected hereby, the Government-District contracts shall remain effective only to the extent expressly provided in this contract. This contract shall become effective upon the date of its execution by the Secretary, after approval by the Congress in accordance with Section 7 of the Reclamation Project Act of 1939.

Description and Cost of Project Works

8. (a) The United States has constructed or will construct the following principal works to serve the lands within the District:

(1) Wickiup Dam and Reservoir, located on the Deschutes River, having an active storage capacity in excess of 180,000 acre-feet,

(2) The North Unit Main Canal, consisting of the necessary structures, tunnels, flumes, wasteways, and related works to regulate and carry the project water supply from the Deschutes River to the project lands,

(3) Laterals and sublaterals heretofore built by the United States for delivery of water to project lands,

(4) Telephone lines, buildings, operating roads, river channelization work, gaging stations, and all facilities and structures required in connection with the construction, operation and maintenance of the project,

(5) Haystack Dam and regulating reservoir located in sections 26, 27, 34 and 35, township 12 south, range 13 east, Willamette Meridian, to have an active storage capacity of approximately 6,500 acre-feet,

all as determined by the United States to be necessary for irrigation service to approximately 59,000 acres of irrigable lands within the District. The project works, except for Haystack Dam and regulating reservoir, are substantially completed, and the United States, within the limit of the District's maximum obligation and subject to the provisions of this contract, shall complete the remaining work.

(b) The estimated construction cost of the works described in (a) of this article is $14,000,000, including $1,600,000 as the estimated cost of Haystack Dam and reservoir. The amount includes the sum of $1,617,758 which is the agreed cost of value of labor, materials and supplies heretofore provided for construction purposes by the CCC and CPS and is to be deducted from the reimbursable repayment obligation. This amount also includes funded operation and maintenance charges and amounts expended and estimated to be expended by the United States in connection with the land classification, economic and related studies, and the negotiations in connection with this contract. This amount does not include the costs of $515,304.15 associated with providing an alternate source of power to replace existing and potential power production affected by the operation of the project storage works.

The District's Construction Charge Obligation

9. (a) Of the total estimated construction costs set forth in article 8, the sum of $12,130,000, including $1,600,000 as the estimated cost of the construction of Haystack Dam and reservoir, is hereby established as the District's maximum construction charge obligation to the United States on account of construction expenditures made or to be made by the United States and funded water delivery cost deficits under and in connection with the Government-District contracts and this contract, this sum being exclusive of the sums of

(1) $1,617,758 as the nonreimbursable cost of labor, materials and supplies provided by the CCC and CPS,

(2) $10,678.60 being repaid by the City of Prineville under the contract of June 2, 1952.

(3) $140,497.05 being contributions received toward construction costs as of December 31, 1952,

(4) $91,242.67 being miscellaneous revenues accrued to December 31, 1952, and

(5) $515,304.15 being the costs associated with providing an alternate source of power to replace existing and potential power production affected by the operation of the project storage works.

The maximum construction charge obligation reduced by

(1) Any payments made by the District on account of construction charges prior to the effective date of this contract, including any excess of water rental collections over operation and maintenance costs not otherwise applied against construction costs,

(2) Collections from water users organizations, individuals, or local governmental units on account of construction costs included in determining the District's maximum construction charge obligation, and

(3) The difference, if any, between estimated costs and actual costs, comprises the District's net construction charge obligation under this contract.

(b) There has not been reflected in the District's construction charge obligation any allocation of project costs by reason of benefits from the project to other than irrigation purposes. If allocation of project construction costs on a nonreimbursable basis is authorized by law either in connection with the authorization of this contract or in connection with general changes in the Federal Reclamation Laws, that allocation shall be reflected hereunder by deduction from the unaccrued balance of the District's construction charge obligation as of the date the allocation is made.

(c) Collections from water users organizations, individuals, and local governmental units on account of construction costs not included in determining the District's construction charge obligation will not be credited against the District's construction charge obligation as established under (a) of this article.

(d) The construction charge obligation shall be repaid by the District to the United States in successive annual installments determined as provided in articles 12 and 13.

District's Construction Charge Obligation To Be General Obligation; District To Levy Assessments

10. (a) The obligation of the District to pay the full amount of the construction charge obligation as finally adjusted, is a general obligation of the District, regardless of delinquencies as to particular lands of the District in the payment to the District of assessments and charges.

(b) The District shall cause to be levied and collected all necessary assessments and charges, and will use all of its authority and resources as an irrigation district to make all payments to the United States when due and to meet its other obligations under this contract. The District may elect to levy and collect toll charge for the collection of its construction charge installments.

(c) Should the District be in default at any time in the payment of construction charge installments, the Secretary, by written notice to the District may require the District to levy toll charge for the collection of its construction charge installments from water users in advance of water delivery.

Project Area

11. (a) The classified irrigable land within the project comprises 58,902.8 irrigable acres, all of which are authorized to receive irrigation water pursuant to water rights issued by the State of Oregon and have in the past received water pursuant to such State water rights.

(b) The lands designated as irrigable are obligated to repay the construction charge obligation of the District in accordance with article 12 and on the basis provided in article 13. The designations "Class A" lands and "Class B" lands are made to take account of differences in repayment ability and project benefits by reason of productivity, topography, soil class and other factors.

(c) While the classification of lands as the basis of determining annual installments to be paid hereunder by the District to the United States shall be as above stated, the District may for purposes of assessments and matters of its own internal administration, make adjustments in the basic irrigable area from time to time so long as irrigation service is provided to no more than approximately 59,000 acres and no amendment to the District boundary is required.

(d) The water supply made available under this contract shall be furnished to, and used only on, lands comprising the irrigable area, as this area may be revised from time to time as herein provided, and may further be used for instream purposes, including fish or wildlife purposes, to the extent that such use is required by Oregon State law in order for the District to engage in, or take advantage of, conserved water projects as authorized by Oregon State law.

Determination Of Basic Annual Installments

12. (a) The construction charge obligation of the District, as provided in article 9, shall be repaid by the District to the United States in successive annual installments determined as provided in this article.

(b) The basic annual installment for each year, for the District, under this contract, on account of the District's construction charge obligation, shall be as follows:

(i) Initially, and until the fiftieth year following the year, as announced by the Secretary, in which the project is served by a domestic water system either in accordance with the plan set out in the report entitled "Deschutes Project Domestic Water System, Oregon, 1951" or otherwise provided to the project area, the basic annual installment shall be $136,500.

(ii) Thereafter, the basic annual installment shall be $193,800.

The foregoing amounts were determined on the basis of rounded amounts obtained by multiplying the basic irrigable area in the District as shown in (a) of article 11 by $3.15 (the rate per acre) for Class A lands and by $1.75 (the rate per acre) as to Class B lands for the initial period, giving an average rate of $2.75 per acre, with the rates increased to $4.30 and $2.90 for the final period, giving an average rate of $3.90 per acre. The District directors may assess on the basis of a uniform average rate or at their option at any variable rate established pursuant to assessment procedures authorized by law so long as sufficient amounts are collected annually to meet the foregoing basic annual installments as adjusted under the provisions of article 13. Should the District default in the payment of construction charge installments to the United States, the District thereafter, if requested by the Secretary, shall assess on the basis of the foregoing variable rates for each class of lands as adjusted pursuant to the provisions of article 13.

(c) The initial installment shall be for the year 1956. There shall be applied as payment of the installments first coming due the amount of water rental revenues in excess of operation and maintenance costs, which amount, as of December 31, 1952, is approximately $128,055.37. Payment by the District to the United States for each successive annual installment shall be due and payable one-half on or before April 15 of the year following the year for which it is applicable, and one-half on or before the succeeding June 30. Until the construction charge obligation is paid in full, each of the said annual installments shall be in an amount determined by increasing or decreasing the basic annual installment pursuant to the provisions of article 13 hereof. The last of said installments to be paid by the District shall not exceed the amount necessary to make the total of the installments equal to the District's total construction charge obligation.

(d) Advance payments on account of the construction charge obligation for any lands within the project irrigable area as established in article 11 may be made by the landowner to the District and shall be forwarded by the District to the United States. Appropriate adjustments shall then be made in the assessments or collections by the District from such land for such construction charge obligation so long as such advance payment is equal to such assessment or charge that would otherwise have been levied and collected. Appropriate adjustments shall also be made in the basic annual installment as determined in this article. No such advance payments shall be refunded.

(e) Nothwithstanding the above subsections of this Article or Article 13 below, beginning with the irrigation season immediately following the date of enactment of the National Forests, Parks, Public Land, and Reclamation Projects Authorization Act of 2007, the annual installment for each year, for the District, under the Contract, on account of the District's construction charge obligation, shall be a fixed and equal annual amount payable on June 30 of the year following the year for which it is applicable, such that the District's total construction charge obligation shall be completely paid by June 30, 2044.

Adjustment of Annual Installments

13. (a) The basic annual installment on account of the District's construction charge obligation as determined in article 12 for each calendar year shall be subject to increase or decrease as follows:

(1) The maximum irrigable acreage within the District stated in article 11, for the purpose of this article, comprises the "project contract unit."

(2) Each calendar year for which the basic annual installments are to be adjusted wider this article, the Secretary shall determine the "annual returns" and shall determine the "normal returns" for the project contract unit, and shall determine the "parity ratio."

(i) "Annual returns" shall mean the amount of the gross crop returns per acre of the area in cultivation within the project contract unit for any calendar year.

(ii) "Normal returns" shall be determined by taking the weighted average of the annual returns of those ten calendar years of the thirteen-year period including the calendar year for which normal returns are being determined and the twelve calendar years preceding it, in which the annual returns for such years are highest. Until such time as adequate records of annual returns for a full thirteen-year period from all irrigation blocks in the District are available, the normal returns shall be determined by filling out the thirteen-year period by using the appropriate annual returns from the following tabulation:

Year	Area in cultivation in acres	Per acre annual returns in dollars
1942	50,000	$ 77.24
1943	50,000	102.43
1944	50,000	120.90
1945	50,000	129.29
1946	50,000	162.87
1947	50,000	196.45
1948	50,000	176.31
1949	50,000	203.17
1950	50,000	147.76
1951	50,000	193.10
1952	50,000	167.91

(iii) The "parity ratio" for each calendar year shall be determined as follows:

There shall be determined, (1) for the commodity group "all crops and livestock", the average for the year of the national index of prices received by farmers for the commodity group; (2) the average national parity index; and (3) the ratio of the average national index of prices received by farmers for the commodity group to the average national parity index. Average indexes, as required by this subarticle, will be derived by finding the simple average of the monthly indexes of prices received by farmers for this commodity group and the simple average of the monthly national parity indexes. This ratio shall be the parity ratio for that year.

The national index of prices received by farmers and the national parity index to be used in the foregoing computation shall be those determined by the Secretary of Agriculture under the provisions of Title II of the Agriculture Act of 1948 (Public Law 897, 80th Congress, 2d

Session), as it may be amended from time to time. The commodity group to be used under (iii) above for the foregoing computations may be changed from time to time by the Secretary if a change is requested by the District's board of directors and if the Secretary finds that such a change is justified because the commodities currently being used in those computations no longer are principal or important factors in the agricultural economy of the project contract unit. If the parity prices which are basic to the determination of the parity ratio hereunder cease to be determined officially by the Secretary of Agriculture at any time during the repayment period, the factor of parity ratio shall no longer be applied in determining any installment under this contract.

(3) A determination of the annual and the normal returns and the parity ratio by the Secretary for any calendar year will be on the basis of final figures as nearly as practicable. The Secretary, however, on or before the final assessment date of any year, will on request of the District provide it with an estimate of these factors for that year. In connection with such request, the District will provide the Secretary with a preliminary crop report for the year at least ten days prior to the date upon which the estimate is requested.

(4) Each calendar year for which the basic annual installments are to be adjusted under this article, the Secretary shall determine the percent of normal returns for said year by which the annual returns for that year exceed or are less than the normal returns. For each one percent (1%) or major fraction of one percent (1%), there shall be an increase or decrease, respectively, of two percent (2%) in the installment for that year, as determined under the provisions of article 12, and that sum shall be further increased or decreased by multiplying it by the parity ratio determined under the provisions of this article; provided, that in no event shall the amount of such adjusted installment be less than fifteen percent (15%) or more than one hundred seventy-five percent (175%) of the basic annual installment for that year, as determined under the provisions of article 12. In no event, however, shall the last installment payable by the District under the provisions of article 12 and of this article be in an amount greater than necessary to complete payment of the construction charge obligation under this contract. The Secretary shall notify the District of his determinations under this article on or before March 1 of the calendar year following that for which such determinations are made.

(b) Whenever the construction charge obligation of the District has been reduced to an amount equal to or less than the basic annual installment as provided in article 12, the unaccrued portion shall be paid on the due dates of the next installment without further adjustment under this article.

Project Water Supply

14. (a) The water supply available for irrigation of the lands within the project entitled to receive water and incidental stock and domestic uses and for instream purposes, including fish or wildlife purposes, to the extent that such use is required by Oregon State law in order for the District to engage in, or take advantage of, conserved water projects as authorized by Oregon State law, shall comprise all of the water within the rights, both natural flow and storage, acquired and appropriated, or to be acquired and appropriated, for the project for irrigation, stock and domestic uses, and for instream purposes as described above, that becomes available by the operation of the irrigation system, including natural flow rights out of the

Crooked River held by the District. As of the date of this contract, there are in effect, among other water rights, the following withdrawals heretofore made by the State Engineer of the State of Oregon and applications for permits made for the benefit of the project in conformity with the provisions of the laws of the State of Oregon:

Withdrawal order made by John H. Lewis, State Engineer for the State of Oregon, under date of February 28, 1913, and

Withdrawal order made by Charles E. Stricklin, State Engineer for the State of Oregon, under date of November 22, 1934, both in accordance with the provisions of Chapter 87 of the General Laws of Oregon of 1913, in furtherance of the order of the State Water Board of Oregon entered on November 26, 1921, allotting certain waters to the North Unit Irrigation District.

Application for Reservoir Permit No. R-24920, covering the storage of 187,000 acre-feet of water in Wickiup Reservoir.

Application to Appropriate Waters Permit No. 24921 covering the diversion of 1,200 cubic feet per second of the waters of the Deschutes River, a tributary of the Columbia River.

Pursuant to the arrangements made at the time of the filing of the above designated applications for permits, they will be assigned by the District to the United States within one year of the effective date of this contract, or such later time as may be determined by the Secretary, but in no event later than one year after the completion of the final actions in the proceeding in the circuit court of the State of Oregon entitled "In the Matter of the Determination of the Relative Rights to the Use of the Waters of the Deschutes River and its Tributaries, a Tributary of the Columbia River". Until the application for permits are so assigned, the District will take the necessary actions to keep them in full force and effect and the Secretary, at the request of the District, will provide any necessary information or assistance to the District to carry out this obligation. After assignment, the United States will undertake any further actions necessary to complete the application for permits pursuant to the provisions of the laws of the State of Oregon. Nothing contained in this paragraph shall be deemed to foreclose, estop or in any manner deny the right of the United States or the District to seek further permits or to take other appropriate steps to appropriate waters and store waters on behalf of the project.

(b) The project water supply available under this contract includes and is subject to the provisions of the contract between the United States and the Central Oregon Irrigation District of August 5, 1939, and of the contract of January 4, 1938, among the Central Oregon Irrigation District, the Jefferson Water Conservancy District, the Arnold Irrigation District, and the Crook County Improvement District No. 1, as those contracts have been or may be amended; and shall be in keeping with the decree of the circuit court of the State of Oregon for the County of Deschutes, entered on February 10, 1928, as heretofore or hereafter modified, in the proceedings entitled "In the Matter of the Determination of the Relative Rights to the use of Waters of the Deschutes River and its Tributaries, a Tributary of the Columbia River".

(c) All irrigable lands in the project area shall have equal priority as to time with respect to the right to receive water from the project works, regardless of the time when the

particular lands or the District was first supplied with water from the project works, and the distribution of water shall be subject to the provisions of this contract.

(d) In case a dispute arises as to the character, extent, priority or validity of the right of the United States or the District to use the water supply claimed for the project, the District shall promptly bring and diligently prosecute judicial proceedings for the determinations of such dispute and shall take all other measures necessary for the defense and protection of the project water supply, either independently or in cooperation with the United States, when the Secretary in his discretion determines that such proceedings or other measures are desirable. Nothing in this paragraph, however, shall be construed as precluding the United States, either independently or in cooperation with the District, from taking such action in order to protect the project water supply.

(e) The United States or the District does not abandon or relinquish any of the waste, seepage or return-flow waters attributable to the irrigation of the lands to which water is supplied under this contract. All such waters are reserved and intended to be retained for the use and benefit of the United States and the District as a source of supply for the lands of the project. If suitable drainage or return-flow water from any part of the project shall at any time be or become available at points where it can be used on lands of the project, the United States or the District may utilize such water as a part of the supply to which the lands in the District are entitled.

(f) No liability shall accrue against the United States or the District, any of their officers, agents or employees for damage, direct or indirect, arising by reason of shortages in the quantity of water available through the project works or interruptions in water deliveries to lands in the District resulting from drought, inaccuracy in distribution, hostile diversion, prior or superior claims, accident to or failure of facilities of the project works, whether or not attributable to negligence of officers, agents or employees of the United States, or the District, or other causes of whatsoever kind.

Interim Operation Of Project Works

15. (a) The operation and maintenance of the project works, except for the reserved works, is to be taken over by the District at a time to be announced in writing by the Secretary. Until such notice of transfer, the United States shall continue to operate the project works, and the District shall pay, in advance, the costs of such operation and maintenance as herein provided.

(b) Payment shall be made for the operation of the works to be transferred on the basis of annual estimates by the Secretary. These estimates shall be in addition to the cost of operation and maintenance of the reserved works, as provided in article 19. The notice of this annual estimate shall contain an itemized statement of the estimated cost of operation and maintenance of the works to be transferred to be incurred in the following calendar year. This notice shall be furnished to the District on or before September 1 of the calendar year preceding the one for which the notice is issued. The District shall pay the amount stated in the notice on or before the time established in the notice.

(c) Whenever the funds so advanced to operate the works to be transferred to the District will be inadequate, tile Secretary may give a supplemental notice, stating therein the amount of additional funds required, and the District shall advance that additional amount on or before the date specified in the supplemental notice. If funds advanced by the District under this article exceed the actual cost of operation and maintenance of the works to be transferred to the District for the year for which advanced, the surplus shall be credited on the operation and maintenance charges for the works to be transferred to become due for the next succeeding year.

(d) This article is to be in effect only until such time as the Secretary announces that said works are to be transferred to the District and the District takes over said works in compliance with said notice.

Transferred Works; Care, Operation And Maintenance Thereof

16. (a) At any time after the effective date of this contract, and after consultation with the board of directors of the District, the Secretary may transfer to the District, the care, operation and maintenance of the works defined herein as the transferred works, or any part thereof, but not later than one year after the completion of Haystack Reservoir, or January 1, 1960, whichever happens first. At the time of such transfer, the Secretary shall notify the District of his intention so to transfer to the District and shall furnish an appropriate listing of the works to be transferred.

(b) All equipment and supplies being used by the United States for the operation and maintenance of the works to be transferred and which the Secretary determines, after consultation with the District, will be required for District operation and maintenance may properly be transferred, shall be so transferred. The transfer shall be made, however, only on the making of contractual arrangements satisfactory to the Secretary for payment to the United States, within not to exceed five (5) years from the date of transfer, of that part of the cost of the equipment and supplies involved not theretofore charged to the District.

(c) Upon the works being transferred, the District will accept the care, operation and maintenance of the transferred works, and will continue to care for, operate and maintain the transferred works in such a manner that they will remain in as good and efficient condition and of equal capacity for the carrying and distribution of irrigation water as of the date of the transfer to the District, and will use all proper methods to secure the economical and beneficial use of the irrigation water. The care, operation and maintenance of the transferred works, after transfer to the District, shall be without cost or expense to the United States.

Operation And Maintenance Charges

17. Each year the District shall assess an amount necessary to pay the operation and maintenance of the works of the District, including the reserved works and the transferred works. The assessment to be made hereunder is to be apportioned equally among all lands of the District, and shall include all charges to be made under the terms of this contract, exclusive of the charges for the basic annual installment as provided in article 12 hereof.

Reserve Fund For Operation And Maintenance

18. (a) The District shall establish a reserve fund for operation and maintenance of the transferred works, which fund shall be maintained by the District apart from other District funds in a depository meeting the requirements of the laws of the State of Oregon as to the disposition of irrigation district funds, or may be invested in the United States bonds.

(b) The District shall include in the annual operation and maintenance assessments levied against the water users in the District an annual amount per irrigable acre for the accumulation or replenishment of such reserve fund whenever the fund is an amount less than one-half the average of the past five (5) years' annual costs of operation and maintenance. The annual assessment shall be equal to ten (10) percent of the per acre minimum operation and maintenance charge for that year unless a lesser sum will suffice to establish or replenish the fund.

(c) The fund shall be available only (1) to meet those costs of operation and maintenance of project works which are unusual or extraordinary after advance notice in writing has been given to the Secretary as to a proposed use, and (2) to meet other operation and maintenance costs when the use therefor is approved in advance by the Secretary.

Operation And Maintenance Of Reserved Works

19. (a) The reserved works shall continue to be under the care, operation and maintenance of the United States. The District shall pay to the United States in advance the costs of operating and maintaining the reserved works.

(b) Payment shall be made for each calendar year on the basis of annual estimates made by the Secretary after consultation with the District. The notice of these annual estimates shall contain an itemized statement of the estimated cost of operation and maintenance of the reserved works to be incurred in the following calendar year. The notice shall be furnished to the District on or before September 1 of the calendar year preceding the one for which the notice is issued. The District shall pay the amount stated in the notice on or before the time established therein.

(c) Whenever the funds so advanced will be inadequate to operate and maintain the reserved works, the Secretary may give supplemental notices, stating therein the amount of the additional funds required. If the funds advanced by the District under this article exceed the actual operation and maintenance of the reserved works for the year for which advanced, the surplus shall be credited to the District on charges which are to become due and payable for the succeeding years.

Keeping Transferred Works In Repair; Inspections; Employment Of Manager

20. (a) The District shall promptly make any and all repairs to the transferred works for the proper care, operation and maintenance of the transferred works. No substantial change in any of the transferred works shall be made by the District without first obtaining the written consent of the Secretary.

(b) The Secretary may cause to be made, from time to time, after advance consultation with the District, a reasonable inspection of the transferred works to ascertain that the terms of this contract are being met by the District. Such inspections shall not exceed one a year and the District shall be provided a report of the inspections.

(c) Until the construction charge obligations under this contract have been paid in full, the District shall employ as manager or superintendent a competent irrigation engineer, or other person who has had at least three (3) years' experience as a manager or superintendent in the operation of works similar to the transferred works of the District. The employment of such manager or superintendent shall be subject to the approval of the Secretary. Should the Secretary, after first consulting with the District's board of directors, give notice that any manager or superintendent employed by the District is unsatisfactory in that capacity and provide his reasons therefor, the District will promptly terminate the employment of such person, and will employ one that is satisfactory.

Title Of Project Works

21. Title to the project works, including transferred works, shall remain in the United States until otherwise provided by the Congress.

Minimum Operation And Maintenance Charge To Be Established; Charge For Excess Water

22. (a) The provisions of this article are made with the object, among other things, of encouraging the economical use of water and of distributing the operation and maintenance charges equitably among the lands of the District.

(b) The District, in establishing and collecting its per-acre charges, shall levy a minimum annual operation and maintenance charge against each irrigable acre within the District, and the payment of such minimum charge shall be required whether or not water is used. The amount of water in acre-feet per acre which is to be delivered each year on payment of the minimum annual charge shall be determined by the District, but it shall not exceed two (2) acre-feet. The amount of water, if any, which will be delivered each year in excess of the amount so established shall also be determined by the District after estimating the supply of water to be available for that year for distribution to the lands of the District. For water to be delivered each year in excess of the minimum amounts, the landowners or water users involved shall pay to the District an excess charge as follows:

(1) For the first acre-foot, or fraction thereof, at a rate per acre-foot not less than twenty percent (20%) more than the rate charged per acre-foot for water made available for the year under the annual minimum charge.

(2) For each additional acre-foot, or fraction thereof, at a rate not less than forty percent (40%) more than the rate charged for water made available for the year under the annual minimum charge.

(c) To carry out the provisions of this article, the District shall measure the water delivered to each farm turnout and shall keep individual farm water delivery records. The

excess charge provided for in paragraph (b) of this article shall be computed upon the basis of these water measurements and shall be assessed to and paid by the individual landowners receiving the excess water.

Default: Resumption Of Control Of Transferred Works

23. (a) Should the District, after transfer to the District of the transferred works, default in any manner in the performance of any of the provisions of this contract, and fail to correct the default within sixty (60) days after request in writing by the Secretary so to do, the United States may take over the operation and maintenance of the transferred works. Such operation and maintenance by the United States shall continue until the Secretary determines that all or a part of those works should be retransferred to the District. When such determination is made, written notice thereof, together with the effective date of the retransfer, shall be given to the District; and the District shall accept the operation and maintenance of the portion of the transferred works thus retransferred on the effective date and shall thereafter operate and maintain those works in accordance with this contract.

(b) During any time any of the transferred works are operated and maintained by the United States, the cost of operation and maintenance shall be paid annually in advance by the District to the United States. Such payments shall be on the basis of annual estimates made by the Secretary. Such annual estimates shall contain a statement of the estimated cost of operation and maintenance of the transferred works to be incurred by the United States in the following calendar year. The notice of estimates shall be furnished to the District on or before September 1 of the calendar year preceding the one for which the notice is issued. When the United States takes over initially the operation and maintenance of any part of the transferred works, the Secretary shall give the District immediately:

(1) Notice of the estimated amount of such charge from the time the United States started operating and maintaining the works to the end of that calendar year; and

(2) A notice to cover the following year when the initial taking over occurs after September 1 of any year.

(c) The District shall pay the amounts set out in any such notice on or before the date or dates fixed in the notice, and shall without delay levy whatever special assessments or toll charges are necessary to raise the funds for payment of such mounts.

(d) Whenever the funds so advanced will be inadequate to operate and maintain the works being operated by the United States, the Secretary may give a supplemental notice stating therein the amount of additional funds required, and the District shall advance that amount on or before the date specified in the supplemental notice. If funds advanced by the District under this article exceed the actual cost of operation and maintenance for such works for the year for which advanced, the surplus shall be credited on any amounts thereafter to become due from the District.

Computation Of Costs

24. The cost, which makes up the various obligations to be paid by the District to the United States under this contract, shall embrace all expenditures of whatsoever kind in relation to the function for which the charge is made, including, but without limitation by reason of this enumeration, cost of surveys and investigation, labor, property, material and equipment, engineering, legal, superintendence, administration, overhead, general expenses, inspection, special services, and damage claims of all kinds, whether or not involving the negligence of the officers, agents, or employees of the United States.

Penalty For Delinquency In Payment

25. Every installment or charge required to be paid to the United States under this contract and which remains unpaid after it shall become due and payable shall be subject to, and the District shall pay, a penalty at the rate of one-half percent per month from the date of delinquency.

Termination Of Recordable Contracts

26. (a) The termination date of the provisions of the Government-District contracts providing, for the incremental value features of the recordable contracts entered into thereunder between landowners and the District shall be the effective date of this contract. All payments made or to become due to the District on or before that date under those contracts on account of such provisions shall be retained or collected and applied as therein provided.

(b) After the termination date of these contract provisions the Secretary will announce, by an appropriate recordable document, this termination, and will take appropriate steps, by offering for filing in the appropriate county offices, to establish of public record the fact of termination.

All Benefits Conditioned Upon Payment

27. (a) All benefits to the District and to the project landowners under this contract are conditioned upon the payments herein provided being made. Should the District fail to levy the assessments, tolls or other charges against any lands in the District required to be levied to meet the District's obligation to the United States under this contract, or, having levied, should the District be prevented from collecting such assessments, tolls or other charges by any judicial proceedings, or otherwise fail to collect them, such lands shall not be entitled to receive water from the project water supply, and the District, except as otherwise ordered by a court of competent jurisdiction, shall not deliver water to such lands from the project water supply unless and until arrangements for its delivery have been made with the Secretary.

(b) As to any such lands the District is hereby authorized, as the fiscal agent of the United States, to collect whatever charges may be required under the delivery arrangements made as provided in this article. Payment shall be required as a condition precedent to the delivery of water. Collections so made by the District shall be paid promptly to the United States in the manner directed by the Secretary.

(c) No action taken by the Secretary under the provisions of this article shall in any manner relieve the District of the obligation assumed by it under this contract.

No Water To Be Delivered In Case Of Default

28. (a) No water from the project water supply shall be delivered by the United States to or for the District if it is in arrears in the advance payment of operation and maintenance charges owed to the United States, or more than twelve (12) months in arrears in the payment of construction charge obligation installments, or more than twelve (12) months in arrears in the payment of any other amounts owed to the United States under this contract. The District shall refuse to deliver water to lands or parties who are in arrears in the advance payment of operation and maintenance charges due from such lands or parties to the United States or to the District, or to lands or parties who are in arrears for more than twelve (12) months in the payment of amounts due from such lands or parties to the United States or to the District for the construction charge obligation or for any other amounts owed by the District to the United States under this contract. The District may refuse to deliver water to lands or parties who are in arrears in any payments due from such lands or parties to the District.

(b) The United States may enter on the transferred works or any part thereof in possession of the District to shut off water being delivered in violation of the provisions of this article. In the event the United States enters onto the transferred works or any part thereof in possession of the District, neither the United States, nor its officers or employees, shall be liable for any damages resulting directly or indirectly from said entry or any damages that result directly or indirectly from the refusal to deliver water even though water had been theretofore delivered in violation of the provisions of this article.

Lands For Which Water Is Furnished; Limitation On Area

29. (a) The water delivered under the terms of this contract shall be used solely for the distribution by the District to water users for irrigation and domestic uses incidental thereto on lands entitled thereto as provided in article 11 and for instream purposes, including fish or wildlife purposes, to the extent that such use is required by Oregon State law in order for the District to engage in, or take advantage of, conserved water projects as authorized by Oregon State law.

(b) The District (and the United States at any time it is operating and maintaining the transferred works) will operate the irrigation system to the end of making available to each irrigable acre of land in the District, during each irrigation season, that quantity of water to which it is entitled.

(c) Pursuant to the provisions of the Federal Reclamation Laws, water made available hereunder shall not be delivered to more than one hundred sixty (160) irrigable acres in the ownership of any one person or other entity, except that if irrigable lands in excess thereof have been acquired by foreclosure or other process of law, by conveyance in satisfaction of mortgages, by inheritance or devise, water therefore may be furnished temporarily for a period not to exceed five (5) years from the effective date of such acquisition or such longer period as may be approved by the Secretary. In the case of an individual either having stock in two or

more corporations which have title to irrigable lands within the project, or owning irrigable land in his own name and having stock in a corporation or corporations which have irrigable lands within the project, the individual's proportionate stockholdings in such corporation shall be regarded as proportionate interests in the corporations' landholdings for the purposes of the application of the acreage limitation stated in this article. The limitation stated in this subarticle shall cease to operate when the construction charge obligation of the District hereunder to the United States has been paid in full. It shall cease also as to the land in any one ownership when the construction charge obligation hereunder estimated to be allocable to such land, in accordance with applicable state procedures for assessments (exclusive of the possible joint liability of the land which shall continue until the District's construction charge obligation to the United States has been paid in full), has been fully paid to the United States. In the event the Congress changes the excess lands provisions of the Federal Reclamation Laws, the United States will, at the option of the District, negotiate an amendment of this paragraph (c) consistent with such change.

Crop Returns And Census

30. (a) The District shall keep record of all crops raised on lands within the District. The District shall furnish the United States each year a report covering such crops, on or before December 31 of that year.

(b) At such times as the Secretary deems it necessary or desirable, but only after first consulting with the board of directors of the District, the Secretary may cause a special crop census to be taken on all or any part of the lands in the District, but such special census shall not be taken oftener than once each calendar year. Such a census shall be for the purpose of checking the crop reports furnished to the United States by the District and of furnishing an independent source of information as to the agricultural income from the lands in the District. In connection with such a census the Secretary may require information to be given under oath. In the event any water user refuses to give such information when requested to do so by the Secretary's authorized representative, the representative may estimate the crop production and per-acre income of such water user. Estimates so made shall be given the same weight as though based on information furnished under oath by the water user in adjusting the annual sum to be paid by the District under this contract.

Books, Records And Reports

31. (a) The District shall maintain a modern set of books of account, showing all financial transactions of the District, keep such other records as the Secretary may request, and submit such reports based thereon as he may require from time to time.

(b) Subject to applicable Federal laws and regulations, the District, or its proper representative, shall have full and free access at all reasonable times to the project account books and official records of the Bureau of Reclamation relating to the construction, operation and maintenance of the project and the status of the accounts concerning the District's payments of construction and operation and maintenance charges, with the right at any time during office hours to make copies thereof. Subject to applicable state laws and regulations, the proper

representatives of the United States shall have similar rights in respect to the account books and records of the District.

Overhead, Inspection and Other Charges To Be Paid By The District

32. (a) On April 15 of each year, from the effective date of this amendatory contract until the District's construction charge obligation to the United States is repaid in full, the following costs for each calendar year, ending on the preceding December 31, shall be paid:

(1) The cost of all inspections under the provisions of article 20.

(2) Cost of any special crop censuses under the provisions of article 30.

(3) Other direct costs for work performed for the benefit of the District or the project by the United States, which, by the Federal Reclamation Laws, are chargeable to the District.

(b) The first payment under this article shall be due and payable by the District on April 15 of the year following the notice provided in article 16 hereof, and shall cover the calendar year ending the preceding December 31, but the determination of costs hereunder shall not include items of cost that have accrued and for which the District shall have made other arrangements for payment or satisfaction.

Performance Of Work With Contributed Funds

33. (a) At the request of the District, the United States, at its option, pursuant to the Act of March 4, 1921 (41 Stat. 1367, 1404), may perform with funds contributed by the District any construction or maintenance work within the authority of the District but which is not otherwise provided for by this contract. If the United States determines that it will undertake any such work, funds therefor shall be advanced by the District as directed by the Secretary. The advance shall be accompanied by a certified copy of a resolution of the District describing the work to be done and authorizing its performance by the United States with the funds of the District.

(b) After completion of any work so undertaken, the United States shall furnish the District with a statement of the cost of the work done. Any unexpended balance of the funds advanced will be refunded to the District or applied as otherwise directed by the District.

Confirmation Of Contract

34. The execution of this contract shall be authorized or ratified by the qualified electors of the District at an election held for that purpose.

Changes In District Organization

35. While this contract is in effect, no changes shall be made in the District, either by inclusion or exclusion of lands, by partial or total consolidation or merger with another district, by proceedings to dissolve or otherwise, except with the consent of the Secretary evidenced in writing.

Regulations And Determinations Of Fact

36. (a) The Secretary, after consultation with the District, may, so far as the purport thereof may be consistent with the provisions of this contract, make regulations and add to and modify them, as are proper and necessary to carry out the true intent and meaning of this contract, and to supply details of its administration.

(b) In the event the District questions any factual determination made by any representative of the Secretary as required in the administration of this contract, any findings of fact on the facts in dispute thereafter made by the Secretary shall be made only after consultation with the District's board of directors.

Notices

37. Any notice, demand or request required or authorized by this contract shall be deemed properly given, except where otherwise herein specifically provided, if mailed, postage prepaid, to the Regional Director, Bureau of Reclamation, Boise, Idaho, on behalf of the United States, and to the Secretary, North Unit Irrigation District, Madras, Oregon, on behalf of the District. The designation of the person to be notified or the address of such person may be changed at any time by similar notice.

Discrimination Against Employees or Applicants For Employment Prohibited

38. The District shall not discriminate against any employee or applicant for employment because of race, creed, color or national origin, and shall require an identical provision to be included in contracts relating to the performance of this contract. This provision, however, does not refer to, extend to, or cover the activities of the District which are not related to or involved in the performance of this contract.

Contingent On Appropriations or Allotment Of Funds

39. The expenditure of any money or the performance of any work by the United States herein provided for, which may require appropriations of money by the Congress or the allotment of Federal funds, shall be contingent on such appropriations or allotments being made. The failure of the Congress to appropriate funds, or the failure of any allotment of funds shall not, however, relieve the District from any obligations heretofore accrued under this contract, nor give the District the right to terminate this contract as to any of its executory features. No liability shall accrue against the United States in case such funds are not so appropriated or allotted.

Successors And Assigns Obligated; Assignments

40. The provisions of this contract shall apply to and bind the successors and assigns of the parties hereto, but no assignment or transfer of this contract, or any part thereof, or interest therein, shall be valid until approved by the Secretary.

Officials Not To Benefit

41. No Member of or Delegate to Congress or Resident Commissioner shall be admitted to any share or part of this contract or to any benefit that may arise herefrom, but this restriction shall not be construed to extend to this contract if made with a corporation or company for its general benefit.

IN WITNESS WHEREOF, the parties hereto have signed their names the day and year first above written.

THE UNITED STATES OF AMERICA

By /s/ Douglas McKay
Secretary of the Interior

NORTH UNIT IRRIGATION DISTRICT

By /s/ Ben Evick
President

(SEAL)

Attest: /s/ Harold J. Eidemiller
Secretary

STATE OF OREGON)
) ss.
County of Jefferson)

On this 13th day of February, 1954, before me, a Notary Public in and for the State of Oregon, personally appeared Ben Evick, President of the North Unit Irrigation District, known to me to be the person described in the foregoing instrument, and acknowledged that he executed the same in the capacity therein stated and for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

/s/ Ann Landreth
Notary Public for Oregon
My commission expires Sept 3, 1957

(SEAL)

DISTRICT OF COLUMBIA : ss.

I, Harold L. Byrd, a notary public in and for the District of Columbia, do hereby certify that Douglas McKay, Secretary of the Interior, who executed the foregoing contract with the North Unit Irrigation District, dated February 13, 1954, personally appeared before me, the said Douglas McKay being personally known to me as the person who executed the said contract on behalf of the United States of America, and acknowledged the same to be his act and deed.

Given under my hand and seal this 2nd day of September, 1954.

/s/ Harold L. Byrd
Notary Public in and for the
District of Columbia
My commission expires May 14, 1957

ATTACHMENT 8: IL-1770, CW-102 FINAL ORDERS

BEFORE THE WATER RESOURCES DEPARTMENT
OF THE
STATE OF OREGON

In the Matter of Instream Lease Application IL-1770, Deschutes County	)	DETERMINATION and FINAL ORDER ON PROPOSED INSTREAM LEASE

Authority
Oregon Revised Statute (ORS) 537.348 establishes the process in which a water right holder may submit a request to lease an existing water right for instream purposes. Oregon Administrative Rule (OAR) Chapter 690, Division 077 implements the statutes and provides the Department's procedures and criteria for evaluating instream lease applications.

Lessor
North Unit Irrigation District
Mike Britton, Manager
2024 NW Beech Street
Madras, Oregon 97741

Findings of Fact

1. On September 19, 2019, North Unit Irrigation District filed an application to lease a portion of Certificate 51229 for instream use. The Department assigned the application number IL-1770.

2. Pursuant to OAR 690-077-0076 (2)(b), the owner of any storage facility which is the source of water for a lease must be a co-lessor. The Bureau of Reclamation (BOR) is the storage facility owner for the water right being leased instream and is not a co-lesser. On December 19, 2019, the Department received an email from the BOR with consent and agreement of the processing of this instream lease application for storage instream out of Wickiup Reservoir.

3. The portion of the right to be leased is as follows:

Certificate: 51229 in the name of North Unit Irrigation District (appropriated under Permit S-23196)
Use: Storage under Reservoir Permit No. R-1677
Priority Date: February 28, 1913
Quantity: **Volume:** 1605.17 Acre-Feet (AF)
Source: Deschutes River, tributary of Columbia River for storage in Wickiup Reservoir

Reservoir Location:

Twp	Rng	Mer	Sec	Q-Q	Measured Distances
22 S	9 E	WM	7	SW NE	1830 FEET SOUTH AND 1950 FEET WEST FROM THE NE CORNER OF SECTION 7

This is a final order in other than contested case. This order is subject to judicial review under ORS 183.484. Any petition for judicial review must be filed within the 60 day time period specified by ORS 183.484(2). Pursuant to ORS 536.075 and OAR 137-004-0080 you may either petition for judicial review or petition the Director for reconsideration of this order. A petition for reconsideration may be granted or denied by the Director, and if no action is taken within 60 days following the date the petition was filed, the petition shall be deemed denied.

4. The Lessor has requested that stored water from Wickiup Reservoir be leased instream during the period of November 1 through March 25, a 146 day period, with a volume of 1505.17 acre-feet. Given the proposed instream period, up to 5.54 cfs may be leased instream.

5. The lease application includes the information required under OAR 690-077-0076(3). The Department provided notice of the lease application pursuant to OAR 690-077-0077(1). No comments were received.

6. The instream use has been modified from the lease application to prevent injury and enlargement and is as follows:
Deschutes River, tributary of Columbia River for storage in Wickiup Reservoir

Instream Reach: From the OWRD Gauge Station #14056500 (WICO) to Lake Billy Chinook

Certificate	Priority Date	Instream Rate (CFS)	Instream Volume (AF)	Period Protected Instream
51229	February 28, 1913	5.54	1605.17	November 1 through March 25

7. Other conditions to prevent injury and enlargement are:

Within the specified stream reach, the amount of water to which this right is entitled shall not exceed the quantity of water legally available at the original point of diversion. Stream channel losses and gains calculated based on the best available data and the use of water by senior appropriators will determine the amount of water to which this right is entitled downstream from the original points of diversion within the specified stream reach.

The instream use may be conditioned to allow for less water to be protected instream below the gauge based upon instream measurements conducted by Department staff or other approved by the Department, which may show lower or higher levels of loss and allow the instream flows to be adjusted accordingly but may not exceed the instream quantities identified at the reservoir.

8. The amount and timing of the proposed instream flow is allowable within the limits and use of the original water right.

9. The protection of flows within the proposed reach is appropriate, considering:

   a. The instream water use begins at the recorded point of diversion;

   b. The location of confluences with other streams downstream of the point of diversion.

   c. There are known areas of natural loss of streamflow to the river bed downstream from the point of diversion; and

   d. Any return flows resulting from the exercise of the existing water right would re-enter the river downstream of the reach of the instream water right.

10. The total monthly quantities of water to be protected under the existing and proposed instream rights in the reach will provide for a beneficial purpose.

11. The total monthly quantities of water to be protected instream under existing and proposed instream rights in the reach do not exceed the estimated average natural flow.

12. If approved, this instream lease is not reasonably expected to significantly affect land use as prescribed by ORS 197.180, OAR Chapter 660, Divisions 30 and 31, and OAR Chapter 690, Division 5.

13. Based upon review of the application, information provided by the Department's Watermaster, and other available information, the Department finds that the lease will not result in injury or enlargement. The order approving this instream lease may be modified or revoked under OAR 690-077-0077 if the Department later finds that the lease is causing injury to any existing water right or enlargement of the original right.

14. If a right which has been leased is later proposed to be leased again, transferred and/or reviewed under an allocation of conserved water, a new injury review shall be required. For example, instream transfers will be subject to a full and complete review to determine consistency with the requirements of OAR Chapter 690, Division 380 and Division 077. Approval of this lease does not establish a precedent for approval of any future transactions.

15. The Lessor has requested that the lease terminate on March 25, 2020. The lease may commence on the date this final order is signed.

16. The Lessor has not requested there be an option to terminate the lease.

Conclusions of Law

The Department concludes that the lease will not result in injury or enlargement, OAR 690-077-0077. The lease conforms to the applicable provisions of OAR 690-077-0015.

Now, therefore it is ORDERED:

1. The Lease as described herein is APPROVED.

2. During the term of the lease, the former place of use will no longer receive water as part of these rights, any supplemental rights, or any other layered irrigation water rights, including ground water registrations and permits.

3. The term of the lease will commence upon approval of the instream lease and terminate on March 25, 2020.

Dated at ~~Salem~~, Oregon this day DEC 3 1 2019.

Lisa J. Jaramillo, ~~Transfer and Conservation Section~~ Manager, for
Thomas M. Byler, Director, Oregon Water Resources Department

This document was prepared by Sarah Henderson. If you have any questions, please call 503-986-0884.

Mailing date: JAN 0 2 2020

MEMORANDUM OF AGREEMENT
TO PERPETUALLY LEASE WATER TO INSTREAM USE

This AGREEMENT TO PERPETUALLY LEASE WATER TO INSTREAM USE (this "Agreement") is made this 19th day of January, 2021 (the "Effective Date"), by and between the NORTH UNIT IRRIGATION DISTRICT ("NUID") and the Oregon Water Resources Department ("OWRD") (collectively, the "Parties").

RECITALS

A. NUID is the holder of Water Right Certificates 72279 and 90177. Certificate 72279 is for the use of natural flow water from the Deschutes River and stored water from Wickiup Reservoir and Haystack Reservoir. Certificate 90177 is for the use of natural flow water from the Crooked River.

B. On February 12, 2018, NUID filed an Allocation of Conserved Water Application (designated as application number CW-102), requesting an Allocation of Conserved Water under Certificates 72279 and 90177. As documented in CW-102, NUID proposed to conserve approximately 137 acre-feet (AF) of Crooked River water and 610 AF of Deschutes River water by lining approximately 2.2 miles of NUID's 58-11 irrigation lateral, and improving the overall efficiency of the delivery system. The project was completed by March 2019.

C. On October 5, 2020, OWRD issued an Amended Preliminary Determination, proposing to approve CW-102. In particular, paragraph 16 of the Amended Preliminary Determination (pp. 17-18) provides as follows:

"Until such time as the statutes and rules are updated regarding reservoir storage rights, NUID shall lease a like quantity of the State's portion of conserved water from Wickiup Reservoir. The lease shall provide for the conservation, maintenance and enhancement of aquatic and fish life, wildlife, fish and wildlife habitat, and other ecological values, and pollution abatement. The lease shall be from Certificate 51229 as follows:

"**Source: Wickiup Reservoir** located in the SWNE of Section 7, Township 22 South, Range 9 East, W.M. at approximately River Mile 227.0:

Originating Certificate	Priority Date	Period of Use	Rate (CFS)	Volume (AF)
72279	2/28/1913, *plus one minute*	November 2 through March 31	1.01	301.95

To Lake Billy Chinook at approximately River Mile 120.0."

"Until such time as the statutes and rules are updated regarding reservoir storage rights, an equivalent quantity to the Applicant's portion from the storage component shall be leased instream under Certificate 51229 until a Notice of Use and Disposition form is submitted as required by OAR 690-0018-0062(3)(b). NUID will obtain the necessary contract with the BOR, if any, for the release of stored water from Certificate 51229 as follows:

Source: Wickiup Reservoir located in the SWNE of Section 7. Township 22 South, Range 9 East, W.M. at approximately River Mile 227.0

Originating Certificate	Priority Date	Period of Use	Rate (CFS)	Volume (AF)
72279	2/28/1913, *plus one minute*	November 2 through March 31	0.52	155.55

To Lake Billy Chinook at approximately River Mile 120.0."

Consistent with and pursuant to the above requirements, the Parties desire to memorialize NUID's commitment to perpetually lease water under Certificate 51229, until such time as the relevant statutes and rules are updated regarding reservoir storage rights, under the terms and conditions set forth below.

AGREEMENT

1. **Instream Lease of State's Portion of Conserved Water from Wickiup Reservoir.** Consistent with OWRD's approval of CW-102, NUID agrees to apply to OWRD to lease water under Certificate 51229 for the maximum five-year term, from the following source, in the following quantity, and for the following purposes:

Source: Wickiup Reservoir located in the SWNE of Section 7, Township 22 South, Range 9 East, W.M. at approximately River Mile 227.0:

Originating Certificate	Priority Date	Period of Use	Rate (CFS)	Volume (AF)
72279	2/28/1913, *plus one minute*	November 2 through March 31	1.01	301.95

Purpose: Conservation, maintenance and enhancement of aquatic and fish life, wildlife, fish and wildlife habitat, and other ecological values, and pollution abatement

Prior to the expiration of the lease, NUID shall apply to OWRD to renew the lease for an additional five-year term, and shall do so perpetually until such time as the statutes and rules are updated regarding reservoir storage rights. At such time that the statutes and rules are updated regarding reservoir storage rights, NUID shall coordinate with OWRD to have the leased water making up the State's portion of conserved water from Wickiup Reservoir under CW-102 incorporated into a permanent instream water right.

NUID agrees to abide by any terms and conditions included in OWRD's approval of the lease application, and OWRD's approval of any renewal application.

2. **Instream Lease of NUID's Portion of Conserved Water from Wickiup Reservoir.** Consistent with OWRD's approval of CW-102, NUID agrees to apply to OWRD to lease water

under Certificate 51229 for the maximum five-year term, from the following source, in the following quantity, and for the following purposes:

Source: Wickiup Reservoir located in the SWNE of Section 7, Township 22 South, Range 9 East, W.M. at approximately River Mile 227.0:

Originating Certificate	Priority Date	Period of Use	Rate (CFS)	Volume (AF)
72279	2/28/1913, *plus one minute*	November 2 through March 31	0.52	155.55

Purpose: Conservation, maintenance and enhancement of aquatic and fish life, wildlife, fish and wildlife habitat, and other ecological values, and pollution abatement

Prior to the expiration of the lease, NUID shall apply to OWRD to renew the lease for an additional five-year term, and shall do so perpetually until such time as the statutes and rules are updated regarding reservoir storage rights, or until a Notice of Use and Disposition form is submitted as required by OAR 690-0018-0062(3)(b). In the event of such a submittal to OWRD, NUID shall request OWRD approval to terminate the lease of NUID's portion of conserved water from Wickiup Reservoir in conjunction with approval of the submittal.

NUID agrees to abide by any terms and conditions included in OWRD's approval of the lease application, and OWRD's approval of any renewal application.

3. **Fees and Assessments**. NUID shall be solely responsible for any fees or assessments associated with the instream lease applications or renewal applications set forth in Paragraphs 1 and 2 above. NUID agrees to submit both initial instream lease applications within 14 days of the Final Determination approving CW-102.

4. **OWRD Consideration and Approval of Lease Applications**. OWRD will process and review the lease applications and any renewal applications described in Paragraphs 1 and 2 above consistent with the statutes and rules governing such applications and renewal applications. If approved, OWRD agrees that the applications and any renewal applications shall satisfy the requirements set forth in paragraph 16 of the Amended Preliminary Determination (pp. 17-18).

5. **General Provisions**.

5.1 **Termination**. This Agreement may be terminated at any time by mutual consent of the Parties, provided that such consent to terminate is in writing and is signed by each of the Parties.

5.2 **Execution**. Each Party to this Agreement represents, warrants, and agrees that the person who executed this Agreement on its behalf has the full right and authority to enter into this Agreement on behalf of that Party and bind that Party to these terms. This Agreement may be signed in counterparts.

IN WITNESS WHEREOF, NUID and OWRD have executed this Agreement as of the date first written above.

North Unit Irrigation District:

By: Mike Britton
Manager, North Unit Irrigation District

Oregon Water Resources Department:

Douglas Woodcock

By: Douglas E. Woodcock
Deputy Director

ATTACHMENT 9: DRAFT NUID DEMAND ANALYSES

AMP Insights

DRAFT TECHNICAL MEMORANDUM

To: BOR Watersmart Water Marketing Project Team
From: Tess Gardner and Sarah Kruse, AMP Insights
Date: September 2020
Subject: DRAFT FOR REVIEW PUPOSES ONLY – North Unit Irrigation District Demand Analyses

1. Introduction

AMP Insights is working with Central Oregon Irrigation District (COID) to develop a water marketing strategy with the primary goals of increasing water availability to North Unit Irrigation District (NUID) and restoring streamflow in the Upper Deschutes River. The purpose of this memo is to provide a more detailed understanding of potential demand for irrigation water in NUID both in terms of volume and economic value to inform the water marketing strategy. The results of this memo will be integrated into the full scoping and planning analysis deliverable that is part of the water marketing strategy development process.

Before discussing the analyses, several general limitations should be noted:

- This effort relied solely on existing, publicly available data and conversations with NUID personnel and other local agricultural and water management experts.
- In order to estimate potential benefits at the farm, district and regional levels, general assumptions were made about crops grown on a "typical farm" in NUID as well as the percentage of NUID made up by such farms.
- Assumptions related to annual precipitation and irrigation water availability were based on historical data and do not account for potential changes in the future related to climate change, water management, etc.
- These analyses occur in the context of water-limited high value producers having access to a water market of senior water rights that are moderately to very reliable, especially in comparison to the purchasers' current water rights.
- The scenarios for additional water applications upon which the analyses are based are purposefully conservative and assume that, at these levels of change in crop production, local, regional, and national markets are not impacted in ways that would change crop value. Variability in market pricing is captured by making use of crop market values averaged over longer time periods, when that information is available.
- This demand analysis only deals with on-farm demand and does not account for the efficiency of on-farm irrigation technology. Furthermore, the analysis does not attempt to calculate increases in carry water for the district as a whole to support the delivery of additional demand.

Given these limitations, multiple analyses were conducted to provide a range of results and outcomes. More specifically, the analyses undertaken included:

- Estimating the demand for and value of additional water from the perspective of an individual farmer under two scenarios — one where increased water availability allows for additional cuttings of alfalfa and another involving conversion of cropland to one of two seed crops (bluegrass and carrot seed);
- The demand for and value of additional water at the district-scale for the same under the same two scenarios; and

- The impact of additional water applied on NUID lands to the regional economy.

There are several terms that are used to communicate the results of these analyses that should be clearly defined.

- Gross value represents the total value of production and does not take into account production (or any other) costs. In the context of this analysis, gross value refers to the additional value associated with crops produced through acquisition of additional water.
- Net value typically represents gross value less costs. In the context of this analysis, it represents the gross value less costs associated with crops produced through acquisition of additional water and may or may not include costs associated with the acquisition of additional water. Net value (assuming all costs are accounted for) is synonymous with net income or profit.

The first section of this memo provides a brief overview of NUID, describes the general assumptions made to create a "typical farm," and estimates baseline demand for water. The next three sections explore additional water demand and potential benefits of additional water use at four geographic scales including per acre, farm, irrigation district, and region. Water demand and net value are explored under two scenarios: 1) additional water used on forage lands to achieve additional cuttings of alfalfa; and 2) the conversion of other cropland including forage, grain, and fallowed land to carrot or bluegrass seed. All values are presented in 2019 dollars unless stated otherwise.

2. Overview of NUID

NUID is comprised of approximately 59,000 acres of land with appurtenant water rights. For the time period from 2009-2019, between 82% and 95% of NUID lands have been irrigated ("North Unit Irrigation District Deschutes and Crooked River Acres Combined Crop Report," n.d.). Approximately 82% of NUID's irrigated acres are irrigated with water from the Deschutes River with the remaining 18% irrigated from the Crooked River.

The annual initial allotment of water from the Deschutes River, determined by the NUID board in March based on projected water year conditions, from 1990-2020 has been restricted to below NUID's full paper water rights for 16 out of the 31 years. The initial allotment under restricted conditions has averaged 1.87 acre-feet (AF) per acre (AFA)(M. Britton, personal communication, 6/24/2020, North Unit Irrigation District 2020). In contrast, NUID's Deschutes River water rights are for 5.25 AFA, so, assuming a seepage loss of 25% (presuming delivery through both the main canal and laterals), during a restricted water year, on average, approximately 47% of the paper water right is allotted to an NUID farmer (Kaler and Crew 2017).

2.1 Typical NUID Farm

The parameters used to define a typical NUID farm in the analyses below are: 100-150 acres with 50-70 acres of seed crop (carrot seed and bluegrass seed), 20-40 acres of forage, and 20-40 acres of grain. These parameters are an interpretation of information provided by Mike Britton, NUID District Manager. Some portion of the forage land (approximately 30 acres) could be fallowed or cover cropped in a given year. Acreage in cultivated grain typically would be the first crop fallowed if water were reduced during the season, followed by acres in forage. As described above, the typical farm in NUID depends on less water than their paper water right. It is assumed that the operators of the typical farm described here would be likely to participate in a water market. Finally, typical farms as described here are estimated to account for approximately 25,000 acres, or 42% of the district (M. Britton, personal communication, 6/24/2020).

2.2 Demand for Excess Mid-Season Water

When initial allotments of water are reassessed after they are set in March, excess water may be made available to NUID patrons mid-season. Excess water is offered to all patrons equally. From 1990-2019, mid-season allocations have increased patrons' initial allotments in 10 of the 31 years. In two of the years, restrictions were lifted entirely, though in 2014 this only occurred after two rounds of reallocation. Most years (18 years) there was no change to the initial allocation, and in one instance (1993) the initial allocation was reduced. (North Unit Irrigation District 2020)

This allocation system provides a unique opportunity to assess demand and willingness-to-pay for additional water above the initial allotment.

For those years in which excess water was offered to patrons mid-season, the average mid-season allocation increase was 0.37 AFA. Excess mid-season water rarely results in a NUID patron receiving their full paper water right — which occurred in only three of the thirteen mid-season adjustments. If the initial allotment is below the paper water right, years in which excess mid-season water is made available typically had higher initial allotments than those years when the initial allotment is not adjusted through the season. (North Unit Irrigation District 2020)

It is estimated that approximately 80% of NUID patrons take advantage of excess mid-season water when it is offered (M. Britton, personal communication, 6/24/2020). Assuming that this 80% of patrons make up a proportionate amount of the irrigated acres of NUID, mid-season excess water demand would average approximately 17,400 AF, which is skewed upwards in the latter half of the available period of record by the years 2003, 2014, and 2017. Given that this volume of demand rarely represents full satisfaction of NUID patrons' paper water rights it provides a low-bound estimate of demand rather than an average or high-bound estimate. The assumption is that the mid-season excess water is purchased to either achieve an additional cutting of forage (potentially on land of lesser productivity) or mitigate the impacts of deficit irrigation and, if a greater volume of more reliable water were available, NUID patrons would be interested in obtaining their demand up to the volume of their paper water right.

3. Marginal Demand and Returns for Additional Water at the Farm-Scale

If additional water were made available to NUID patrons, it could have two potential applications, which produce divergent demands and result in different magnitudes of agricultural value. Additional water could be applied to forage lands to produce additional cuttings of alfalfa. This water use is an opportunistic one that does not require significant advance notice of the availability of additional water. The amount of acreage in forage in NUID indicates that there may be demand from a large amount of acreage for this additional supply. The higher-value use of additional water is captured through the conversion of lower value or idle croplands to seed crop. However, the upfront cost of seed cultivation and the need for over a year's notice of the availability of reliable water supply for cultivation and sales contracting restricts this opportunity's impact. This section attempts to assess the value of both the use of additional water to produce additional cuttings of forage and the use of additional water to increase seed acreage, taking into account such variables as variable operation costs, market value of crops, and crop yield. (M. Britton, personal communication, 6/24/2020)

3.1 Marginal Return for Additional Water on Forage Lands

When excess mid-season water is available to NUID patrons, it is typically applied to forage lands to increase yield (M. Britton, personal communication, 6/24/2020). The application of additional irrigation water on forage lands is opportunistic in that advance notice of additional water is not necessary, and the

excess water can be used if and when it becomes available. Crop reports from NUID indicate that, while a variety of forage types are grown on NUID patron lands, including pasture, grain hay, or silage, the largest category of forage grown by number of acres is alfalfa (Table 3-1).

Table 3-1. Percent of NUID Forage Land by Crop Type

Year	Alfalfa Hay	Irrigated Pasture	Silage or Ensilage	Grain Hay	Other Hay
2009	48%	18%	0%	4%	31%
2010	47%	15%	0%	3%	35%
2011	46%	18%	0%	2%	35%
2012	51%	17%	0%	5%	28%
2013	46%	16%	1%	6%	32%
2014	51%	14%	2%	7%	27%
2015	52%	13%	1%	3%	31%
2016	47%	14%	1%	5%	33%
2017	45%	13%	2%	5%	36%
2018	44%	14%	2%	3%	36%
2019	44%	16%	1%	5%	33%

Although it is possible that up to four cuttings of alfalfa could be harvested every irrigation season in Central Oregon, due to the junior status of NUID water rights, NUID farmers typically only harvest two to three cuttings each season (M. Bohle, personal communication, 8/4/2020). This suggests that water is a limiting factor for additional forage crop cuttings on NUID farms and additional mid-season water (or water from a water market) could be used on forage crops to increase the number of cuttings per season.

To gain an understanding of the potential demand for water to achieve additional cuttings of alfalfa several assumptions about "typical" alfalfa production were required. First, the net irrigation water requirement (NIWR) of alfalfa was apportioned by cutting (Table 3-2).

Table 3-2. Alfalfa NIWR by Cutting

Cutting	NIWR (%)	NIWR (AF/acre)
1	24%	0.58
2	19%	0.47
3	24%	0.57
4	34%	0.82

Note: NIWR volumes and proportions sourced from Cuenca et al. 1992 using approximate cutting dates from Central Oregon Agricultural Research Center (2015a; 2015b; 2015c; 2015d).

Second, a determination of what constitutes a "normal" year needed to be made. A comparison of the NIWR for the first two cuttings of alfalfa to the Deschutes River allotments for NUID patron lands shows that the NIWR is typically below, and thus covered by, the Deschutes River allotment of NUID irrigation water. Additionally, in only five years from 1990-2020 was the initial allotment of Deschutes River water not sufficient for even three cuttings of alfalfa (North Unit Irrigation District 2020).

Anecdotally, however, if a water year is particularly dry farmers may transfer water from low value cropland to their higher value crops to increase their revenue and/or fulfill contracts on those high value crops. In addition, in water short years, irrigation water for alfalfa may be prioritized and directed to healthier, more productive acres. In addition, although the 2020 irrigation allotment (1.25 AF/acre) appears sufficient for two cuttings of alfalfa, it was stated that most lands may only achieve one cutting

(M. Bohle, personal communication, 8/4/2020). Given these observations, it is assumed that, on average, NUID acres in alfalfa produce only two cuttings per season if there are water restrictions and/or if additional allotments are not made.

Finally, for the time frame considered, in years when water was not restricted or additional mid-season water was available, average yield per acre was 5.34 tons/acre. This is assumed, therefore, to be represent average yield in years when NUID farmers receive sufficient water such that four cuttings of alfalfa are possible (recall, however, that water shortage is generally the rule rather than the exception in NUID). Using this average yield and the proportional yield by cutting determined through use of alfalfa variety trials, these two cuttings of alfalfa would yield an average of 3.02 tons/acre (USDA 2020; Central Oregon Agricultural Research Center 2015a; 2015b; 2015c; 2015d). Proportional yields of third and fourth cuttings were estimated to be 2.32 tons/acres combined, thereby making up a smaller proportion of overall yield than that of first and second cuttings (3.02 tons/acre).

The market value of the third and fourth cuttings were calculated using market prices sourced from USDA agricultural surveys for Oregon, with prices ranging from $175-$267 per ton for the years 2010 to 2019 (Central Oregon Agricultural Research Center 2015a; 2015b; 2015c; 2015d; USDA 2020).

In total, the per acre gross value of third and fourth cuttings of alfalfa was estimated to range from $404 to $619 (Table 3-3). The range in gross value is driven by variability in market price per ton over the timeframe from which this data was sourced (i.e., 2010 to 2019).

Table 3-3. Gross Value of Additional Alfalfa Cuttings

	3rd Cutting			4th Cutting			Total for 3rd and 4th Cuttings		
Measure	Min	Max	Average	Min	Max	Average	Min	Max	Average
Per Acre	$172	$262	$210	$233	$356	$285	$404	$619	$495

Next, variable costs were estimated and subtracted from the gross value in order to estimate the net value without water costs of additional cuttings. Variable costs were sourced from two unpublished Oregon State University crop budgets for 2014-2015 alfalfa production in central Oregon (M. Bohle, personal communication, September 2020) and included only costs associated with additional cuttings such as labor and materials. Labor and harvest costs, calculated as an average of the two production types (i.e., small bales and 3x4x8 bales) and updated to constant 2019 dollars, were estimated to be approximately $78/ton.

The average net value of additional alfalfa cuttings, not including water costs, were estimated to range from $95 to $186 per acre for the third cutting and $129 to $253 for the fourth cutting (Table 3-4). The range of net value is driven by the market price of alfalfa over time.

Table 3-4. Net Value of Additional Alfalfa Cuttings without Water Costs

	3rd Cutting			4th Cutting			Total for 3rd and 4th Cuttings		
Measure	Min	Max	Average	Min	Max	Average	Min	Max	Average
Per Acre	$95	$186	$133	$129	$253	$181	$224	$439	$315

As the focus of the proposed water market is on volumetric quantities, net value without water costs also can be expressed per acre-foot (AF) of additional water, with the net value of additional water to achieve two additional hay cuttings ranging from a minimum of $161 per AF to a maximum of $315 per AF (Table 3-5).

Table 3-5. Net Value of Additional Water to Achieve Additional Alfalfa Cuttings

	3rd Cutting			4th Cutting			Total for 3rd and 4th Cuttings		
Measure	Min	Max	Average	Min	Max	Average	Min	Max	Average
Per AF	$167	$326	$234	$158	$308	$221	$161	$315	$226

The previous analysis assumed no cost to acquire the water required for two additional cuttings. Next, the potential net value of two additional cuttings was calculated using a range of costs for acquiring the additional water necessary. The net value under a scenario where additional water could be acquired at no additional cost was previously calculated, but was included in Table 3-6 as a point of reference against which other scenarios could be compared.

The second column in Table 3-6 set the cost of water equal to the average cost of excess mid-season water from NUID. The per AF charges for NUID excess mid-season water typically fall far below the estimated per AF net value range — from 2010 to 2019 mid-season excess water costs have ranged from $27 to $38 for the first AF of excess, with an average cost of $32/AF. This cost then was converted to a per acre value using NIWR requirements for the third and fourth cuttings.

In the final column, the cost of water was set equal to the average net value without water costs of the third and fourth cuttings — resulting in zero profit and substantial farmer risk for any year or conditions less favorable than those used in the analysis. Any cost greater than this, in an average year, would result in negative returns, while any cost less than this would result in positive returns.

Table 3-6. Average Net Value/Acre with Water Costs (3rd and 4th Cuttings Combined)

Measure per Acre	No Water Cost	Water Cost = NUID Avg Excess	Water Cost = Avg Net Value
Gross Value	$495	$495	$495
Variable Costs	$180	$180	$180
Water Costs	$0	$44	$315
Net Value	$315	$271	$0

To extrapolate this per acre net value to the farm-scale, the model of the typical NUID farm was used, which assumes that 30 total acres of land is in forage, with 20 in production at any given time (Table 3-7).

Table 3-7. Average Farm-Level Net Value with Water Costs (3rd and 4th Cuttings Combined)

Measure	No Water Cost	Water Cost = NUID Avg Excess	Water Cost = Avg Net Value
Per Farm	$6,290	$5,410	$0

Based on this information, using a market price of $50/AF (a value that was used in the basin study and is not unreasonable for western water markets), the cost of the water to satisfy the NIWR for two additional cuttings of alfalfa would be approximately $70/acre. Adding this cost to the other variable costs still would result in a net value of $245/acre or $4,900 per year for a typical farm.

3.2 Estimated Demand for Water for Additional Seed Acreage

Additional irrigation water is only of value to higher-value crops, such as carrot or bluegrass seed, if its availability can be anticipated months prior to planting so that additional acres of the crop can be planted. Certainty of water supply is necessary because these higher value crops not only require involved and costly infrastructure for irrigation and cultivation, but contracts for the purchase of these crops are

negotiated in advance and have penalties for defaulting on the promised yields (M. Britton, personal communication, 6/24/2020). These two seed crops are typically planted at the end of the irrigation season and harvested late summer or fall of the following year (Jefferson County Seed Growers Association 2020). As such, the availability of sufficient irrigation water has to be certain in February or March of the year preceding the expected harvest date (M. Britton, personal communication, 6/24/2020).

Additional water demand for expanding seed crop acreage was estimated using the typical NUID farm model on which ten additional acres of seed crop would be cultivated if a more secure and sufficient supply of water were available. For the purposes of the analysis, the ten acres of additional seed crop would originate from one of three land uses: 1) fallowed land — no current water use; 2) land cropped with grain; or 3) land cropped with alfalfa.

Each seed crop has a specific water demand that was calculated using the NIWR for carrot seed and bluegrass seed, but if the land converted to seed crop was presumed to originally be cropped with grain or forage, the NIWR of these crops was subtracted from the seed crop NIWR as one water use is being foregone for another.

Carrot and bluegrass seed NIWRs were calculated using the annual and average crop gross irrigation water requirements (GIWR) and precipitation data sourced from the Madras AgriMet station (AgriMet 2020a; 2020b). Although GIWR data was available from 1989-2015, the timeframe 1992-2019 was used as the number of irrigated acres for NUID was reliably available from 1992 forward ("Deschutes Water Planning Initiative Water Supply Goals and Objectives" 2013). From 2015 to 2019, the average value of the crop GIWR, provided by AgriMet, was used to calculate carrot and bluegrass seed NIWR.

The value for alfalfa NIWR was the proportion of total alfalfa NIWR attributable to the first and second cuttings, as calculated in Section 3.1. To calculate the NIWR for grain, the NUID crop reports for grain were used to weight the NIWR by acreage of spring and winter grain (Table 3-8). The weight was applied to the spring grain NIWR for April-August and to the winter grain NIWR for March-May to mimic the irrigation and harvest cut-off dates for these two crops (Jefferson County Seed Growers Association 2020, M. Britton, personal communication, 6/24/2020, M. Bohle, personal communication, 8/5/2020).

Table 3-8. Proportion of NUID Grain Acreage by Type

Year	Spring	Winter
2009	3%	97%
2010	2%	98%
2011	1%	99%
2012	1%	99%
2013	2%	98%
2014	7%	93%
2015	12%	88%
2016	25%	75%
2017	22%	78%
2018	11%	89%
2019	34%	66%

Using this methodology, the change in water demand by acre of converting the three original land uses (fallow, grain, or forage) to carrot or bluegrass seed ranged from a decrease of 0.41 AF/acre to an increase of 1.12 AF/acre (Table 3-9).

Table 3-9. Average Water Demand per Acre for Cropland Conversion to Seed Crops

New Crop	Original Crop	New Water Demand (AF/acre)	Original Water Demand (AF/are)	Change in Water Demand (AF/acre)
Carrot Seed	Alfalfa Hay	0.64	1.05	-0.41
	Grain	0.64	0.89	-0.25
	Fallow	0.64	0.00	0.64
Bluegrass Seed	Alfalfa Hay	1.12	1.05	0.07
	Grain	1.12	0.89	0.23
	Fallow	1.12	0.00	1.12

Assuming that a typical NUID farm would expand their acreage in seed crops by ten acres, the average change in water use at the farm-level could range from a decrease of 4.1 AF to an increase of 11.2 AF if the land was previously fallow.

On the whole, it may be more likely that there could be a decrease in water demand per acre by switching to carrot seed from grain or forage, whereas switching to bluegrass seed likely would cause an increase in demand. The water demand for forage and grain crops, however, tends to be concentrated in the early irrigation season, whereas the water demand for seed crops is spread throughout the irrigation season, extending into the mid-to-late summer when water supply is less certain (Jefferson County Seed Growers Association 2020). This finding suggests that the reason more land is not currently in higher-value seed crops in NUID has less to do with overall crop water needs and more to do with the certainty and seasonality of the water supply and the potential cost of converting cropland to seed crops.

3.3 Estimated Net Value of Additional Seed Acreage

Because carrot and bluegrass seed water demand is, on average, less than demand for forage or grain crops, the question remains whether more cropland has not yet been converted to seed crop because of uncertain water availability alone or whether it is the impact of uncertainty coupled with the operations costs of increasing seed acreage. To address this question, the net value, or benefit, of converting an acre of cropland to seed crop was estimated.

The net value of an additional acre of seed crop was estimated using carrot seed and bluegrass seed yields and market prices for available years between 2010 and 2019 (M. Weber, personal communication, 7/30/2020, Hart and Butler 2004; Central Oregon Agricultural Research Center 2020; "Oregon Agripedia" 2018; USDA 2020). Bluegrass seed yield data were only available for 2012-2017 — across that time frame the average yield in Oregon was 12.6 hundredweight (cwt) per acre. It should be noted that Jefferson County accounts for a large percentage of overall bluegrass seed production in Oregon. Price data were only available at the national level. Across the time frame considered, the average price for the five years of available data was $125.06 per cwt.

Similarly, carrot seed yield data were only available for five of the last ten years. For those years, average yield in Jefferson County was 304 pounds per acre. Price data were available for four of the last ten years, with an average price across those years of $16.76 (in constant 2019 dollars) per pound.

Using this information, and the assumption that in a system not limited by available water supply all seed cropped acres would be harvested, the average per acre value for bluegrass seed and carrot seed were estimated to be $1,708 per acre and $5,091 per acre, respectively. Across years in which both price and

yield data were available for each respective crop type, per acre gross value ranged from $1,575 to $1,874 for bluegrass seed and $4,557 to $5,196 for carrot seed.

Table 3-10. Gross Value of Carrot and Bluegrass Seed Crop

	Carrot Seed			Bluegrass Seed		
Measure	Min	Max	Average	Min	Max	Average
Per Acre	$4,557	$5,196	$5,091	$1,575	$1,874	$1,708

The net value, not including the cost of water, was estimated for the conversion of three cropland types to either of the two seed crops. The costs associated with converting an acre of cropland to seed crop was estimated using change in variable cost estimates for carrot seed and bluegrass seed operations and the foregone value of either forage or grain revenue (Central Oregon Agricultural Research Center 2015a; 2015b; 2015c; 2015d; USDA 2020). Data on yield and market prices for grain and forage came from NASS Quick Stats Database (USDA 2020). Fallowed land was assumed to produce no value on its own. Note that, as mentioned previously, these calculations only include variable costs associated with production on additional acres — representing increased production only by farmers already producing carrot or bluegrass seed — and does not include start-up or fixed costs that would be required on a farm adding carrot or bluegrass seed as a new crop.

Table 3-11. Average Estimated Cost per Acre for Crop Conversion to Seed Crop

Variable Costs and Foregone Value Only ($2019/acre)					
Alfalfa Hay to Carrot	Grain to Carrot	Fallow to Carrot	Alfalfa Hay to Bluegrass	Grain to Bluegrass	Fallow to Bluegrass
$1,545	$1,941	$2,068	$397	$793	$921

In all cases, carrot seed and bluegrass seed have a higher per acre value than forage, grain, or fallowing — meaning the net value without water costs is positive for all crop conversions analyzed. The average per acre net value ranges from $3,022 to $3,546 for conversion to carrot seed and $787 to $1,311 for conversion to bluegrass seed (Table 3-12). Based on these results, all else being equal, conversion of land to carrot seed has a higher value than converting the same land to bluegrass seed.

Table 3-12. Average Net Value per Acre of Crop Conversion to Seed Crop without Water Costs

Net Value ($/acre)					
Alfalfa Hay to Carrot	Grain to Carrot	Fallow to Carrot	Alfalfa Hay to Bluegrass	Grain to Bluegrass	Fallow to Bluegrass
$3,546	$3,150	$3,022	$1,311	$915	$787

Estimating the net value per AF of water is not an exact science due to the interplay of the water demands from the different crops and the seasonality of those water demands. Given that the certainty of water supply for seed crops needs to be high relative to forage and grain crops and seed crop water demand extends further into the summer than either forage or grain, the full water demand for the seed crops is used to estimate the net value per acre-foot of crop conversion to seed crops, rather than attempting to determine the trade-off in water demand from the originating crop to the seed crop.

First, the average NIWR of each seed crop, which are 0.64 AF/acre and 1.12 AF/acre for carrot seed and bluegrass seed, respectively, was used to estimate the per AF value of water (Table 3-13).

Table 3-13. Net Value per AF for Crop Conversion to Seed Crop without Water Costs

Net Value ($/AF)					
Alfalfa Hay to Carrot	Grain to Carrot	Fallow to Carrot	Alfalfa Hay to Bluegrass	Grain to Bluegrass	Fallow to Bluegrass
$5,541	$4,921	$4,722	$1,170	$817	$703

So far, the cost of water has not been considered, in part because under some scenarios considered, water demand might actually decrease. That being said, the average mid-season water charge levied by NUID when mid-season excess water is available is substantially lower than the estimates presented in Table 3-13. The net value per AF could be viewed as a high-bound estimate of the value of water under each scenario, though these values are based on average year conditions and are subject to annual variation.

Although cropland conversion to carrot seed presents the potential for the highest net value, it also potentially presents the greatest risk of loss due to high variable costs of operation if the cost of water were set too high. Additionally, although it would make logical sense that the greatest returns should be realized through the conversion of fallow land to carrot or bluegrass seed, as it was assumed that there are no profits associated with fallowed land, there are actually some cost savings associated with converting grain and forage acreage to seed acreage through variable cost savings associated with the cultivation of grain and forage. The potential for substantial net value of conversion of cropland to seed cultivation suggests that the primary barriers to cropland conversion may be the uncertainty of water availability, externalities stemming from seed contracts, and/or the cost of water to support seed crops.

To extrapolate this per acre net value to the farm-scale, the model of the typical NUID farm was used, which assumes that ten acres of fallow, forage or grain would be converted to seed crop (Table 3-7).

Table 3-14. Average Farm-Level Net Value without Water Costs

Net Value ($/farm)					
Alfalfa Hay to Carrot	Grain to Carrot	Fallow to Carrot	Alfalfa Hay to Bluegrass	Grain to Bluegrass	Fallow to Bluegrass
$35,460	$31,497	$30,222	$13,109	$9,146	$7,871

Consider again a market with a set price of $50/AF for additional water—under this scenario, the cost of the water to satisfy the NIWR for carrot seed and bluegrass seed would be $32/acre and $56/acre, respectively. Subtracting these costs, along with other variable costs, from the gross value per acre in an average year still would result in (depending on the prior use of the land) potential returns of roughly $3,100/acre and $875/acre for carrot seed and bluegrass seed, respectively. For the typical NUID farm, this would result in an increase in net income of potentially $8,750 to $31,000 per year.

3.4 Potential Value of Additional Water at the Farm Level

Two potential uses for additional water on NUID lands — harvesting additional cuttings of alfalfa and converting fallowed land or other cropland to high-value seed crops — have been presented. The net value of water to produce two additional cuttings of alfalfa ranges from $161 to $315 per *additional* AF (up to 1.39 AF max), and the marginal value of water for cropland conversion to seed crop ranges from $703-$5,541 per *additional* AF (up to 0.64 AF for carrot seed and 1.12 AF for bluegrass seed).

In the extreme, the potential value of water to achieve additional cuttings of alfalfa on a typical NUID farm could be calculated as the net value of the additional cuttings — that is, the difference between

variable costs for harvesting the third and fourth cuttings of alfalfa and the market value of those additional cuttings (Turner and Bohle 1995).

A rational farmer could be expected to pay up to the net value of additional water — representing a high-bound estimate of willingness-to-pay (WTP); however, as this also represents the break-even point in an average year for a farmer, it is more likely a farmer would be willing to pay some value less than this in order to make some amount of profit.

In addition, for both potential uses, it is clear that a farmer may take on substantial risk if the price of water is set at the maximum, or even average, net value of water, as year-to-year variability could cause returns from crop sales to be substantially lower than the cost of water and operations combined.

The marginal value of additional water for the two potential applications is still very divergent, so it is important to reiterate why additional water could be so valuable. Additional water achieves its greatest value when the supply is certain and made available to farmers with enough lead-time — over a year — to convert cropland to high-value crops and negotiate contracts based on the new acreage. Water is less valuable to farmers when its use is more opportunistic.

4. Demand and Returns for Additional Water at the District Level

The impact of additional water supply at the district-scale is of interest as a substantial portion of the district has the potential to participate in a water market and the participation of patrons in water transactions may place some operational burden on the district. In this section, the per acre and farm-level analyses of water demand and marginal value of water presented in Section 3 are extrapolated under multiple scenarios of water market participation to provide district-wide estimates of water demand and the value of additional water to the district. The intent of these scenarios is to provide some range of district-wide impact, while maintaining a certain level of conservatism so as to not overstate outcomes by ignoring the potential market impacts of drastic changes in crop production.

In addition to the opportunities to increase cuttings on forage lands and convert land to seed crops, in any given year, an average of 4,375 acres of agricultural land in NUID are not irrigated ("North Unit Irrigation District Deschutes and Crooked River Acres Combined Crop Report," 2009-2019). This underutilized land presents a significant opportunity for water demand, and, although this opportunity is not assessed here, it could be additive to the scenarios evaluated in this section.

4.1 Estimated Demand and Return for Additional Water on Alfalfa Lands

The return for additional water on alfalfa lands at the district scale was extrapolated from the farm-level analysis using three estimates of patron engagement in a water market. Under these three scenarios, patrons request/purchase additional water for:

- 3.4% of NUID irrigated acres (1,979 acres);
- 7% of NUID irrigated acres (3,957 acres); and
- 18% of NUID irrigated acres (10,620 acres).

The first two scenarios represent 50% and 100% of typical NUID farms. As mentioned previously, the typical NUID farm was described as having 20-40 acres of forage land, 20 of which could be in full production at any given time. Multiplying this out to the district level, the first and second scenarios represent additional water demand for approximately 3.4% and 7% of the district's irrigated acreage, respectively. Although these scenarios would provide a range of estimates for water demand for the

typical NUID farm, the estimate is missing an upward threshold as, presumably, there would be interest from patrons with forage lands that do not fall under the typical farm definition.

Therefore, the third scenario expands potential demand beyond the typical farm. Approximately 80% of NUID patrons purchase mid-season water, when available, for the purposes of producing an additional cutting of forage and/or watering back to create a moisture base going into winter (M. Britton, personal communication, 6/24/2020). This proportion was then applied to the acres of alfalfa grown from the NUID crop reports for 2009-2019 to estimate the number of acres in alfalfa in the district that could have demand for additional water. Under this scenario approximately 18% of the district may have additional water demand. Because the volume of mid-season water, of which 80% of the district typically takes advantage, rarely exceeds the volume required to achieve a third cutting of alfalfa, it was assumed that the demand from these acres is satisfied by a third cutting of alfalfa. Therefore, although this scenario provides a higher-value estimate for district demand it may still not represent an extreme estimate of demand.

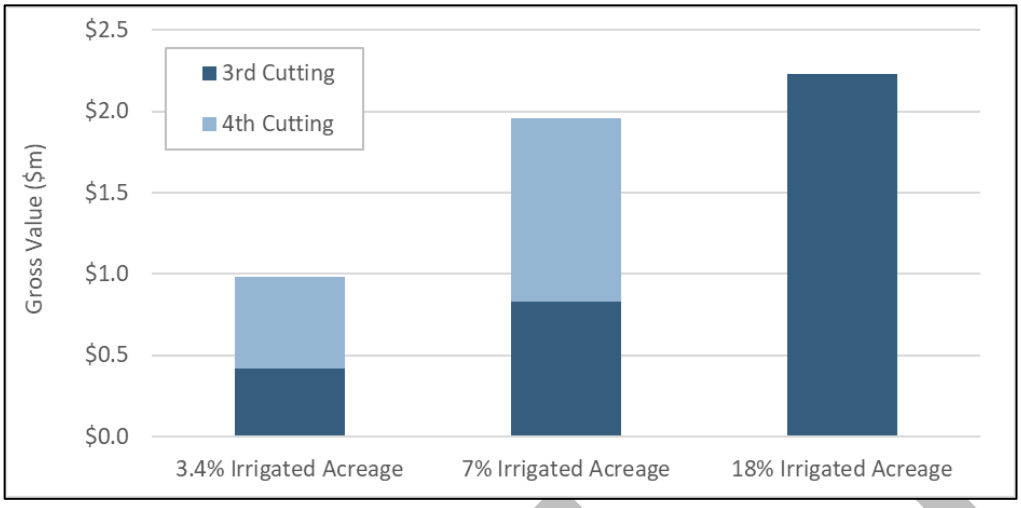
Under the scenarios described, the estimated district-wide demand for additional water ranges from 1,136 AF to 6,098 AF for the third cutting of alfalfa and an additional 1,623 to 3,245 AF for the fourth cutting of alfalfa (Table 4-1). The range in demand is driven entirely by the amount of acreage that would benefit from additional water.

Table 4-1. Potential District Demand for Water for Additional Cuttings of Alfalfa

Additional Water Demand (AF)		
Engagement Scenario	3rd Cutting	4th Cutting
50% of Typical Farms (3.4% Irrigated Acreage)	1,136	1,622
100% of Typical Farms (7% Irrigated Acreage)	2,272	3,245
80% of Alfalfa Hay Acreage (18% Irrigated Acreage)	6,098	N/A

Although there is annual variability in alfalfa yield and market price, this range of potential demand is also a key component of potential district-level gross value. The district-level estimated gross value of a third cutting of alfalfa under the three scenarios considered ranged from $0.4-$2.2 million. The value of the fourth cutting of alfalfa, which was assessed just for the first and second scenarios, ranged from $0.6-$1.1 million at the district-level. On average, the estimated total gross value of additional alfalfa cuttings ranged from $1.0 million to $2.2 million.

Figure 4-1. Average District-Level Gross Value of Additional Alfalfa Cuttings



The estimated district-level net value without water costs of additional cuttings of alfalfa—the value of the additional cuttings less the variable costs (e.g., labor and materials) associated with them—ranged from $0.6 million (with only 3.4% of irrigated lands used additional water) to $1.4 million (where 18% of irrigated lands used additional water).

Table 4-2. Average District-Level Net Value of Additional Cuttings of Alfalfa

Average Net Value w/ No Water Costs ($m)			
Engagement Scenario	3rd Cutting	4th Cutting	Total
50% of Typical Farms (3.4% Irrigated Acreage)	0.3	0.4	0.6
100% of Typical Farms (7% Irrigated Acreage)	0.5	0.7	1.2
80% of Alfalfa Hay Acreage (18% Irrigated Acreage)	1.4	N/A	1.4

Making somewhere between 2,800 AF and 6,100 AF of additional water available to NUID patrons could produce a net value of $0.6-$1.4 million before incorporating the cost associated with acquisition of the additional water. Assuming again a water market with a price of $50/AF and somewhere between 2,800 and 6,100 AF of available water, the average district-level net value after accounting for water costs would range from approximately $0.5-$1.1 million per year.

4.2 Estimated Demand and Return for Additional Water for Added Seed Acreage

The return for additional water from cropland conversion to seed crop at the district-level was extrapolated from the farm-level analysis using three estimates of patron engagement in a water market. Similar to the engagement scenarios for forage, the first two engagement scenarios are for 50% and 100% of typical NUID farms. As the per farm cropland conversion was assumed to take place for just 10 acres of the farm, the scenarios represent 1.7% (989 acres) and 3.4% (1,979 acres) of total NUID irrigated acres, respectively. According to the NUID crop reports from 2009-2019, however, the maximum number of acres in carrot and bluegrass seed was 16,029 acres, which represents 27% of NUID irrigated acres. If this value were to increase by 20% (such as the increase of 10 acres on the NUID typical farm of 50 acres of seed crop), then 3,206 acres of cropland would be converted to seed, or 5.4% of total NUID irrigated acres. This third level of conversion provides a high threshold scenario for district-wide demand for additional water for cropland conversion to seed crop.

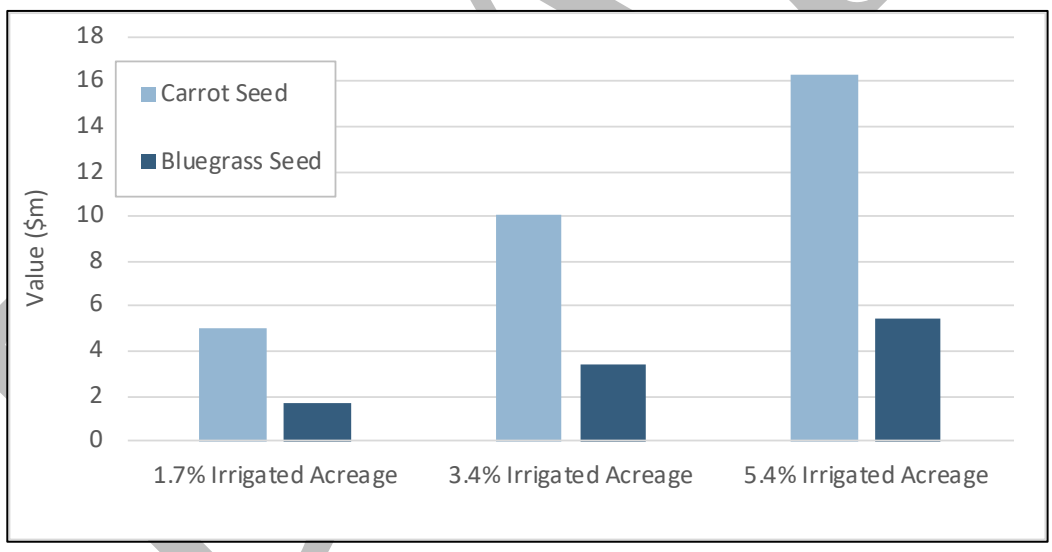
As mentioned previously, the projection of additional water demand for crop conversion to seed crop is complicated by the seasonality of the water demand for the original crop (i.e., forage, grain, or fallow) versus the new crop (i.e., carrot or bluegrass seed). Because water demand for seed crops requires a level of certainty not wholly necessary for grain or forage crops and because the season of use extends much further into the irrigation season than grain or forage crops, the entire demand for the seed crop is used to calculate district-wide additional water demand for crop conversion to seed crops. Under this assumption, demand from typical farms district-wide for additional water that can be provided with season-long certainty at least one year before the start of irrigation season would range from 633 AF to 3,591 AF (Table 4-3).

Table 4-3. Additional Water Demand for Crop Conversion to Seed Crop

Additional Water Demand (AF)		
Engagement Scenario	Carrot Seed	Bluegrass Seed
50% of Typical Farms (1.7% Irrigated Acreage)	633	1,108
100% of Typical Farms (3.4% Irrigated Acreage)	1,266	2,216
20% Increase in Max. Seed Acreage (5.4% Irrigated Acreage)	2,052	3,591

As seen in Figure 2, under these three engagement scenarios, the value of crop conversion to seed crop is substantial given the high market prices paid for seed as opposed to grain or forage, with estimated gross district-wide benefits ranging from $2 million (1.7% of land converted to bluegrass seed) to $16 million (5.4% of land converted to carrot seed).

Figure 4-2. Average District-Wide Gross Value of Crop Conversion to Carrot and Bluegrass Seed



The average net value of conversion to seed crops—net value considers operation costs and foregone value of the original crop, but not costs associated with differences in water demand—for the three scenarios of engagement ranged from $1.0-$10.4 million.

Table 4-4. Average Net Value of Crop Conversion to Seed Crops without Water Costs

Average Crop Net Value ($m)		
Engagement Scenario	Carrot Seed	Bluegrass Seed
50% of Typical Farms (1.7% Irrigated Acreage)	3.2	1.0
100% of Typical Farms (3.4% Irrigated Acreage)	6.4	2.0
20% Increase in Max. Seed Acreage (5.4% Irrigated Acreage)	10.4	2.7

Under a water market scenario with a set price of $50/AF, the average district-level net value after accounting for the cost of additional water could range from approximately $0.9-$10.3 million per year.

5. Regional Impacts of Additional Water Supply to NUID

The opportunity for water-limited high-value producers to access additional moderately to very reliable water supplies has the potential to impact not just those parties directly involved in the market, but the economy of the whole region. This regional impact analysis focuses only on the demand-side impact of water purchased by NUID and is used to generate an additional perspective on crop value, it does not explore the impact of supply-side activities. Input-output modeling (I-O), using regional input-output multipliers (RIMS II multipliers) provided by the Bureau of Economic Analysis (BEA), was performed to analyze the regional economic impact of various levels of engagement in the water market and water costs at the district level for additional alfalfa cuttings and additional acres of seed crop.

5.1 Input-Output Modeling and RIMS II Multipliers

I-O modeling is a method commonly used to model the interrelationships of economic sectors/industries and describe the multiplier effect of changes in one sector/industry across a broader economy and is frequently used to assess the potential economic impact of a new program or investment in a particular industry. Results of I-O analyses are typically expressed as multipliers that represent the additional economic impact above the direct contributions of the industry being considered.

Input-output analyses typically include measurement of three rounds of impacts:

- Direct Impacts – Increase in regional economic output/increases in regional employment
- Indirect Impacts – Increased demand for regionally produced inputs (i.e., goods and services), which in turn generates increased demand for inputs and employment.
- Induced Impacts – Individuals employed by jobs created will in turn spend some of their earnings on regionally produced goods and services.
- Feedback Loop – Regional industries for which demand of good and services increased in the first round of indirect and induced effects also will require additional inputs and labor.

In this analysis, direct economic contributions of the potential water market are the changes in crop value generated through additional water purchased in the market. These investments then support a) indirect impacts - the purchase of supplies and services to support the production of additional crop yield (e.g., purchase of additional crop seed, additional labor for harvesting); and b) induced impacts - personal spending by farmers benefiting from greater crop value as well as any employees of industries providing supplies and services (e.g., purchase of groceries).

RIMS II multipliers are produced by the BEA by a specific industry in a region in order to perform I-O modeling. For this analysis RIMS II multipliers were purchased by the region defined by Jefferson and Deschutes counties. A region can be defined in a variety of ways (e.g., county, metropolitan area,

customized region, etc.), with RIMS II creating the appropriate multipliers for the region defined. Multipliers produced for a given region are indicative of the economic structure of that region and the interrelationships of industries within that region only. As such, it is typical to see a multiplier increase as the size of the region examined increases. The region here is defined by both Jefferson and Deschutes counties due to the potential interplay between the counties' farm economies (i.e., use of the same seed suppliers, farm labor pool, farm equipment suppliers, etc.). For the purposes of this analysis the multiplier of interest is the total economic output multiplier for the farm industry. Output is a duplicative total that estimates the value of goods and services counted multiple times within the region's economy to produce a value for the total amount of economic activity generated by new spending — such as that associated with the potential increased crop value in NUID resulting from access to a water market — and represents the degree to which the original dollars spent are circulated throughout the economy.

An output multiplier also can indicate the degree to which inputs to a given industry are from inside or outside the region. A lower multiplier suggests that more of the inputs for a given industry are produced outside the region and, therefore, a higher proportion of the new spending will leak out of the regional economy. Because a multiplier is a proxy for the regionality of other inputs, the magnitude of an output multiplier may be correlated with the size of a region. The smaller a region the greater the likelihood that goods and services would be imported from outside that region, which would result in new economic value leaking out of that region as reflected by a lower RIMS II multiplier.

The multiplier for total economic output of the farm industry in the defined region is 1.649, a relatively high multiplier that indicates for every new dollar generated in the industry the impact to the regional economy is greater by over one and a half times the dollars generated.

5.2 Regional Economic Impact of Additional Alfalfa Cuttings

The net value of additional alfalfa cuttings was previously explored at the district-level in Section 3.1. It was found that the net value without water costs of 3rd and 4th cuttings of alfalfa in NUID yields between $0.6-$1.4 million and, if a cost of $50/AF of additional water were assessed, the net value of those cuttings would range from $0.5-$1.1 million. For the purposes of the regional economic impact the three scenarios of market engagement previously assessed (3.4%, 7% and 18% of irrigated acres) and three scenarios of water costs (no water costs, NUID average mid-season water costs, and $50/AF) were used to extrapolate the district-level benefits to regional economic impacts.

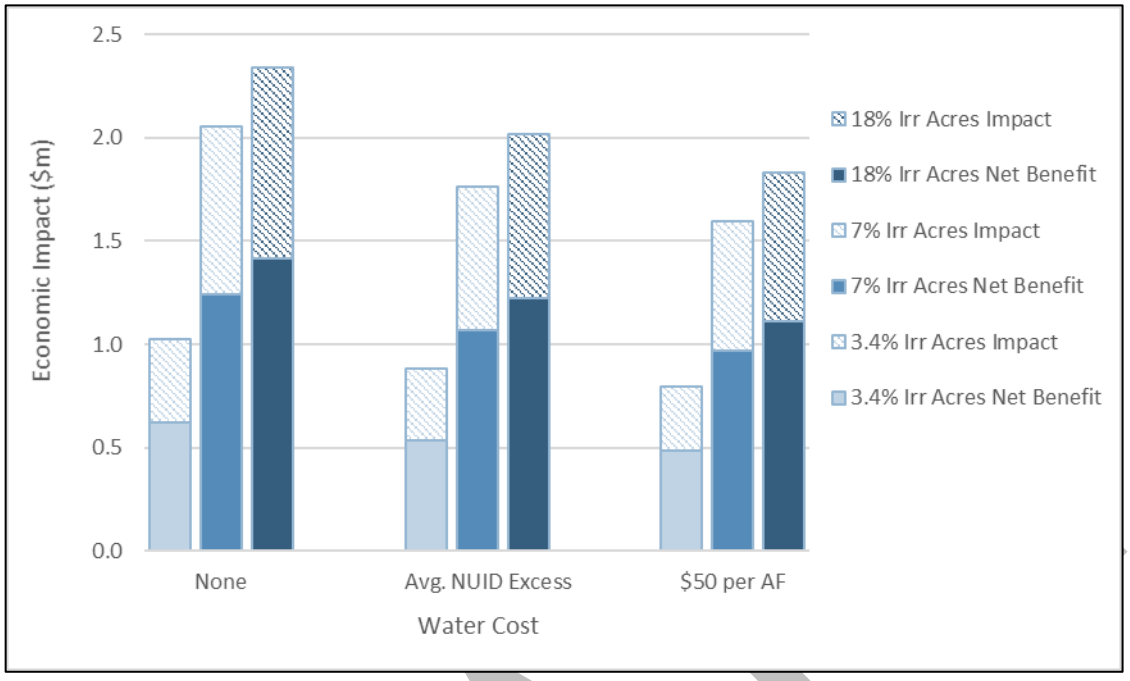
Total economic output from the use of additional water for producing additional cuttings of alfalfa on NUID forage lands ranges from $0.8-$2.3 million per year (Table 5-1).

Table 5-1. Regional Economic Impact of Additional Alfalfa Cuttings

Economic Impact of Additional Alfalfa Hay Cuttings ($m)			
Engagement Scenario	No Water Cost	Water Cost = Avg NUID Excess	Water Cost = $50/AF
50% of Typical Farms (3.4% Irrigated Acreage)	1.0	0.9	0.8
100% of Typical Farms (7% Irrigated Acreage)	2.1	1.8	1.6
80% ofAlfalfa Hay Acreage (18% Irrigated Acreage)	2.3	2.0	1.8

The low-bound of this range is represented by low market engagement (3.4% of irrigated acres) and high water costs ($50 per AF) and the high-bound is generated by high engagement (18% of irrigated acres) and no water costs. The range in impact is driven by both the level of engagement and the cost of water (Figure 5-1).

Figure 5-1. Drivers of Regional Economic Impact of Additional Alfalfa Cuttings



If water costs greater than $50/AF were assessed, one could expect the regional economic impact to decrease proportionally with the 1.649 industry multiplier. The break-even value of water, which was found to range from $161 to $315 per AF for the two additional cuttings combined, represents the cost of water that would produce no, or negative, impacts to the regional economy. This analysis again only evaluates the regional impact from the demand-side of the water market (impact from the activities of the water purchasers) and does not consider what might be the benefits generated by the suppliers of water receiving greater value for their water or the reduction in economic value from reducing irrigation on supplier lands.

5.3 Regional Economic Impact of Additional Seed Acreage

The net value of crop conversion to seed crops, carrot and bluegrass seed, was previously explored at the district-level in Section 3.3. It was found that there was a substantial difference in the magnitude of the value of cropland conversion to carrot seed as opposed to conversion to bluegrass seed (Table 5-2). Therefore, the regional impact analysis explores these two crops separately.

Table 5-2. Average Net Value of Crop Conversion to Seed Crops without Water Costs

Average Crop Net Value ($m)		
Engagement Scenario	Carrot Seed	Bluegrass Seed
50% of Typical Farms (1.7% Irrigated Acreage)	3.2	1.0
100% of Typical Farms (3.4% Irrigated Acreage)	6.4	2.0
20% Increase in Max. Seed Acreage (5.4% Irrigated Acreage)	10.4	2.7

Similar to the regional economic impact analysis of additional cuttings of alfalfa, cropland conversion to both carrot seed and bluegrass seed are analyzed under there different engagement scenarios shown in Table 5-2 and three water cost scenarios: no water costs, NUID average mid-season water costs, and $50/AF. It is important to note that the regional economic impact analysis only uses averaged values for the seed crop, averaging net value across the scenarios of original crop type (fallow, grain, or forage).

If the cropland converted to seed crop in the district were converted only to carrot seed, the regional economic impact would range from $5.3-$17.1 million per year (Table 5-3). It is interesting to note that the range in economic impact is driven almost entirely by the engagement in the water market rather than by the cost of the water.

Table 5-3. Regional Economic Impact of Cropland Conversion to Carrot Seed

Economic Impact of Cropland Conversion to Carrot Seed ($m)			
Engagement Scenario	No Water Cost	Water Cost = Avg NUID Excess	Water Cost = $50/AF
50% of Typical Farms (1.7% Irrigated Acreage)	5.3	5.3	5.2
100% of Typical Farms (3.4% Irrigated Acreage)	10.6	10.5	10.5
20% Increase in Max. Seed Acreage (5.4% Irrigated Acreage)	17.1	17.0	17.0

Alternatively, if all converted cropland in NUID were cropped with bluegrass seed, the regional economic impact ranges from $1.5-$4.4 million per year (Table 5-4). The range in economic impact is still primarily driven by the level of engagement in the market.

Table 5-4. Regional Economic Impact of Cropland Conversion to Bluegrass Seed

Economic Impact of Cropland Conversion to Bluegrass Seed ($m)			
Engagement Scenario	No Water Cost	Water Cost = Avg NUID Excess	Water Cost = $50/AF
50% of Typical Farms (1.7% Irrigated Acreage)	1.6	1.6	1.5
100% of Typical Farms (3.4% Irrigated Acreage)	3.3	3.2	3.1
20% Increase in Max. Seed Acreage (5.4% Irrigated Acreage)	4.4	4.2	4.1

As with the additional cuttings of alfalfa, water costs in excess of $50/AF would result in reduced regional economic impact proportional to the farm industry multiplier of 1.649. The break-even value of water for seed crops is substantially higher for seed crops and differs drastically even between carrot seed and bluegrass seed. Because the break-even value of water is in the hundreds to thousands of dollars per AF for seed crops, it is unlikely that water costs ever would approach this cost threshold, and, therefore, the regional economic impact of cropland conversion to seed crop, from the demand-side, would likely always be positive.

5.4 Summary of Potential Regional Impact of Additional Water Available to NUID

The regional economic impact of additional water made available for purchase by NUID patrons is entirely dependent on the application of the water (i.e. what crop receives the additional irrigation water), the level of patron engagement in obtaining additional water, and the cost of the water to NUID patrons. The greatest potential for positive regional impact is generated by cultivating additional acres of seed crop, particularly carrot seed, so reliable water available for purchase in advance of planting and contract negotiation is critical to produce this anticipated impact. The water application scenarios are not, however, entirely mutually exclusive and engagement in water purchases from both forage and seed farmers could take place, producing an average or additive regional impact depending on the level of engagement and apportionment of water application between the crop types.

Because the defined region of impact for the water market was both Jefferson and Deschutes counties, it is important to reiterate that this impact analysis only considers the impact to the regional economy from the demand side of the water market (those purchasing and applying additional water). In order to have a

full understanding of the impact of a water market in the defined region, the supply side of the market must also be considered. This impact will be explored in a subsequent analysis.

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ATTACHMENT 10

CENTRAL OREGON
Irrigation
DISTRICT
Since 1918

May 5, 2021

Becky Williams
Grant Program Coordinator
Oregon Water Resources Department
725 Summer Street, NE
Salem, OR 97301

RE: Smith Rock-King Way Irrigation Modernization and Conservation Project

Dear Ms. Williams:

Please see the attached letters to COID's J-Lateral and L-Lateral patrons affected by the proposed project notifying them of:

1) COID's application to OWRD's Water Projects Grants and Loans Program for funding to implement the Smith Rock-King Way Irrigation Modernization and Conservation Project, and
2) COID's legal authority to implement the proposed project, and
3) Monitoring information related to the proposed project is a matter of public record.

These letters were emailed to COID patrons as indicated on the attached contact sheet. In addition, COID staff called patrons without email addresses to provide the notifications above. In five instances, COID staff hand-delivered the letter to patrons. COID mailed the letter on the attached list to all patrons.

Sincerely,

Shon Rae
Deputy Director

CENTRAL OREGON Irrigation DISTRICT Since 1918

May 5, 2021

To: COID L-Lateral Patrons
From: COID
RE: Smith Rock-King Way Irrigation Modernization and Conservation Project

Project Background

As part of the Smith Rock-King Way Modernization and Conservation Project (Project) COID will pipe 7,593 linear feet of its J-Lateral and all 15,548 linear feet of its L-Lateral. Collectively these laterals serve 2,194 irrigated acres in the Smith Rock-King Way area of COID and connect to COID's Pilot Butte Canal, a primary conveyance system within COID, which will be piped beginning in fall 2021 as a part of COID's Watershed Plan with Natural Resources Conservation Service (NRCS).

The Project will expedite the benefits of on-demand pressurized water to COID patrons affected by this Project and enable water saved from seepage elimination to be moved to other uses within the Deschutes Basin to help meet critical basin water supply needs for agriculture and for streamflow in the Upper Deschutes River. COID will work with patrons affected by this Project to implement on-farm irrigation efficiency projects under its Regional Conservation Partnership Program grant with NRCS to help optimize patrons' operations with pressurized water.

The portions of the J and L Laterals included in the Project are located within easements granted to COID through federal legislation (Carey Act: Law of August 18, 2894, Ch. 301 § 4, 28 Stat. 422 (1894), 43 USCA § 641 (2000)) and state law (ORS 545.221(1)(c), ORS 545-221(1)(d) and ORS 545.287). These easements give COID the legal authority to implement the proposed project.

Notice

This letter serves as notice to all COID L-Lateral patrons and landowners of record owning property affected by this Project (see the attached map) that:

1) COID intends to pipe the section of the L-Lateral identified in the attached map pursuant to the authority described above and has applied to Oregon Water Resources Department's Water Project Grants and Loans Program to help fund this effort, and

2) If awarded funding from the Water Project Grants and Loans Program, all monitoring information related to the Project will be a matter of public record.

Please direct any questions to Baxter Davies, COID's Operations Technician, at 541-504-7573 or bdavies@coid.org.

Sincerely,

Baxter Davies

Baxter Davies
Operations Technician

CENTRAL OREGON Irrigation DISTRICT Since 1918

May 5, 2021

To: COID J-Lateral Patrons
From: COID
RE: Smith Rock-King Way Irrigation Modernization and Conservation Project

Project Background

As part of the Smith Rock-King Way Modernization and Conservation Project (Project) COID will pipe 7,593 linear feet of its J-Lateral and all 15,548 linear feet of its L-Lateral. Collectively these laterals serve 2,194 irrigated acres in the Smith Rock-King Way area of COID and connect to COID's Pilot Butte Canal, a primary conveyance system within COID, which will be piped beginning in fall 2021 as a part of COID's Watershed Plan with Natural Resources Conservation Service (NRCS).

The Project will expedite the benefits of on-demand pressurized water to COID patrons affected by this Project and enable water saved from seepage elimination to be moved to other uses within the Deschutes Basin to help meet critical basin water supply needs for agriculture and for streamflow in the Upper Deschutes River. COID will work with patrons affected by this Project to implement on-farm irrigation efficiency projects under its Regional Conservation Partnership Program grant with NRCS to help optimize patrons' operations with pressurized water.

The portions of the J and L Laterals included in the Project are located within easements granted to COID through federal legislation (Carey Act: Law of August 18, 2894, Ch. 301 § 4, 28 Stat. 422 (1894), 43 USCA § 641 (2000)) and state law (ORS 545.221(1)(c), ORS 545-221(1)(d) and ORS 545.287). These easements give COID the legal authority to implement the proposed project.

Notice

This letter serves as notice to all COID J-Lateral patrons and landowners of record owning property affected by this Project (see the attached map) that:

1) COID intends to pipe the section of the J-Lateral identified in the attached map pursuant to the authority described above and has applied to Oregon Water Resources Department's Water Project Grants and Loans Program to help fund this effort, and

2) If awarded funding from the Water Project Grants and Loans Program, all monitoring information related to the Project will be a matter of public record.

Please direct any questions to Baxter Davies, COID's Operations Technician, at 541-504-7573 or bdavies@coid.org.

Sincerely,

Baxter Davies
Operations Technician

L-Lateral Patron Contact List

Index #	Name	Tax Map #	Lot #	Site Address	Mailing Address	Phone	Email	Email	Call	Mail	Hand delivered
1	CLAIRE M LAURANCE OREGON TRUST	14132400000	200	4220 NE SMITH ROCK WAY	4736 Jennifer St Boise ID 83704	208-376-4645	clairelaurance@aol.com				
2	STREAM,LINDA	14132400000	100	4710 NE SMITH ROCK WAY	same	541-749-8988	outwestgalleries@gmail.com				
3	EILEEN E BELCHER TRUST	14131300000	1800	4685 NE SMITH ROCK WAY	1 Surf Way #238 Monterey CA 93940	831-224-4627	eileenie49@gmail.com				
4	Wilson, William/Karen	14S14E18	402	20511 NW SMITH ROCK WAY	same	541-419-6866	mrfill97760@gmail.com				
5	Mack, Ginger McFarland	14S14E18	400	20715 NW SMITH ROCK WAY	3887 NE Smith Rock Way Terrebonne OR 97760	none	none				
6	Warner, Thomas/Mary	14S14E18	400	20509 NW SMITH ROCK WAY	same	541-548-4674	captwarner@webformixair.co				
7	Lone Pine, LLC	14S14E18	504	none?	8603 SE Lieser Point Dr Vancouver WA 98664	360-737-8526	none				
8	Johnson, Jason M	14S14E19	200	20501 NW SMITH ROCK WAY	same	None	none				
9	Nash, D'Ann K	14S14E19	202	20510 NW SMITH ROCK WAY	same	541-588-0078	windborneranch@mac.com				
10	Hemphill, Carl/Cynthia	14S14E19	201	20140 NW SMITH ROCK WAY	same	503-631-3707	hemphillcyn50@gmail.com				
11	Schlesinger, Hannah	14S14E19	100	20136 NW SMITH ROCK WAY	same	206-371-9822	Hannah.E.schlesinger@gmail.com				
12	Brooks, Gretchen or Julian, Rebecca	14S14E18	502	19455 NW SMITH ROCK WAY	8603 SE Lieser Point Dr Vancouver WA 98664	360-737-8526	none				
13	BROOKS GRETCHEN, REBECCA JULIAN TRUST, JULIAN REBECCA L TRUSTEE	14S14E18	500	none?	8604 SE Lieser Point Dr Vancouver WA 98664	360-737-8526	none				
14	Brooks, John/Angela	14S14E18	600	5291 NW Lone Pine Rd Terrebonne OR 97760	same	541-279-7971	woodwalker05@yahoo.com				
15	Crook Coiunty	14S14E19	600	NA			plan@co.crook.or.us				
16	Butler, David/Melissa	14S14E20	101	5294 NW LONE PINE RD	same	541-548-6070 cell: 541-420-1528	none				

J-Lateral Patron Contact List

Index #	Name	Tax Map #	Lot #	Site Address	Mailing Address	Phone	Email	Email	Call	Mail	Hand delivered
1	Lisignoli, Mathew William	14131500000	500	1250 NE Wilcox Ave	Same	541-504-1414	matt@smithrockranch.com				
2	Lisignoli, Mathew W.	14131500000	501	1155 NE Smith Rock Way	Same	541-504-1415	matt@smithrockranch.com				
3	Bucaria, Garvan Pat	141314C0000	700	8570 NE 17th St	PO Box 870298 Wasilla AK	907-373-4974	None				
4	Fisher, Sandra K	141314C0000	800	8460 NE 17th St	Same	504-880-6789	sandy@spiritdog.com				
5	Geraldine Emerson Revocable Trust	141314C0000	400	1996 NE WILCOX AVE	same	541-548-3380	None				
6	Abbas, Ike Robert Lee	141314C0000	900	2307 NE SMITH ROCK WAY	Same	541-548-4540	None				
7	SCHOLZ,BRYAN T	141314C0000	300	2042 NE WILCOX AVE	same	541-504-8747	cindyasch@gmail.com				
8	RIGDON,MARY SUE	141314C0000	200	2210 NE WILCOX AVE	same	541-548-1366	None				
9	ABBAS,IKE R L	141314C0000	1000	2311 NE SMITH ROCK WAY	PO Box 321 Terrebonne OR 97760	None	None				
10	DUNN,MAKINAH	141314C0000	1200	2330 NE WILCOX AVE	7936 NE 33rd St Redmond, OR 97756	541-419-5224	drdrocksupply@gmail.com				
11	O'NEAL,BRIAN	141314C0000	1600	2315 NE SMITH ROCK WAY	PO Box 71 Terrebonne, OR 97760	none	None				
12	JETER,ANTHONY VINCENT	141314C0000	1300	2334 NE WILCOX AVE	same	541-325-2324	None				
13	HARING,NICHOLAS C	141314C0000	1500	2335 NE SMITH ROCK WAY	same	541-310-1633	nick@tempritemechanical.com				
14	ALDERSON,NANCY J	141314C0000	1400	2381 NE SMITH ROCK WAY	same	541-923-1603 cell 541-912-1565	None				
15	GILMORE,KRISTIN M	141314C0000	100	2370 NE WILCOX AVE	same	541-306-1592	gilmorekm@gmail.com				
16	ELENES,LUIS	141314D0000	100	2673 NE SMITH ROCK WAY	same	512-680-1192	luiselenes@gmail.com				

ATTACHMENT 11

Schwabe
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May 5, 2021

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Salem, OR 97301

RE: Grant Application for Central Oregon Irrigation District Smith Rock-King Way Irrigation Modernization Project, Areas Affected by the Piping Project and Legal Authority for Activities in those Areas

Dear Becky:

Pursuant to your request, the purpose of this letter is to provide the Oregon Water Resources Department ("Department") with information about the areas affected byCentral Oregon Irrigation District's ("COID") L-Lateral and J-Lateral piping project grant application and the sources of COID's legal authority for operations, maintenance, and improvement of its canals and laterals in the affected areas.

COID is an Oregon irrigation district organized and existing under Oregon Revised Statutes, Chapter 545. For over 110 years, COID has been a steward of critical water resources in Central Oregon. It holds certificated water rights – including rights to live flow and storage water – in a trust relationship with its patrons and delivers water proportionately to patrons who hold water rights within COID's boundaries.

COID's easement rights with respect to its canals and laterals in the affected areas originate from the Carey Act (Law of August 18, 1894, Ch. 301, § 4, 28 Stat. 422 (1894), 43 USCA § 641 (2000)) which encouraged settlement of the western United States by allowing private companies to erect irrigation systems. The Carey Act process utilized two contracts, one between the State of Oregon and the contractor who developed the system and one between the contractor and the entryman, also known as the settlor.

The related federal Right of Way Act of 1891 states:

> The right of way through the public lands and reservations of the United States is granted to any canal ditch company, irrigation or drainage district formed for the purpose of irrigation or drainage, and duly organized under the laws of any State or Territory, and which shall have filed, or may

> hereafter file, with the Secretary of the Interior a copy of its articles of incorporation or, if not a private corporation, a copy of the law under which the same is formed and due proof of its organization under the same, to the extent of the ground occupied by the water of any reservoir and of any canals and laterals and fifty feet on each side of the marginal limits thereof, and, upon presentation of satisfactory showing by the applicant, such additional rights of way as the Secretary of the Interior may deem necessaryfor the proper operation and maintenance of said reservoirs, canals, and laterals; also the right to take from the public lands adjacent to the line of the canal or ditch, material, earth, and stone necessary for the construction of such canal or ditch ….

43 U.S. Code Section 946.

The existence and scope of Carey Act irrigation canal easements have been confirmed in Federal Court for the District of Oregon where Judge Ann Aiken ruled that the irrigation district in that case possessed irrigation rights of way pursuant to the Carey Act and related federal and state statutes and "conversion of [an] irrigation canal to a pipeline is encompassed within the scope of [the] easement." *Swalley Irrigation District v. Gary Clement Alvis, et al*., U.S. Dist. Ct. for Oregon, Civ. No. 04-1721-AA (2008).

Oregon law provides additional support for COID's right to pipe its canals. The Carey Act contract between the State of Oregon and the Contractor anticipated that the Contractor (subsequently the Irrigation District) would promulgate rules and regulations to manage the system. ORS 545.221(1)(c) authorizes districts to "Establish equitable bylaws, rules and regulations for the administration of the district and for the distribution and use of water among the landowners." COID maintains such written rules andregulations.

Also, pursuant to ORS 545-221(1)(d), Oregon irrigation districts, including COID, are authorized "to perform all acts necessary to fully carry out the purposes of the Irrigation District Law." COID enacts policies to maintain and improve its delivery system to ensure its ability to provide water for its patrons while achieving compliance with state and federal laws. Finally, pursuant to ORS 545.287, irrigation districts in Oregon are authorized to construct, repair and maintain irrigation system improvements.

A copy of the Carey Act map for COID's Pilot Butte Canal is enclosed. The affected areas for COID's piping project include the J-Lateral and L-Lateral. These laterals are located off the Pilot Butte Canal, in the general vicinity of Terrebonne, Oregon.

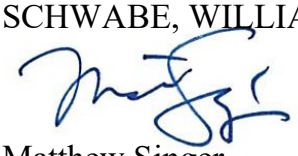
To summarize, the later canals that COID seeks to pipe with grant funds provided by the State of Oregon and others are located within easements granted to COID through

federal and state legislation and related contracts. The *Swalley* federal court case confirmed that such canals and laterals can be piped even over the objection of the owner of the dominant estate.

If you need any additional information, please let me know.

Very truly yours,

SCHWABE, WILLIAMSON & WYATT, P.C.



Matthew Singer

MS/jmh

Enclosure

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