WATERSMART: WATER & ENERGY EFFICIENCY GRANT APPLICATION

FISCAL YEAR 2018

Funding Opportunity Announcement # BOR-DO-18-F006

BOARDMAN EAST - PIPING AND PRESSURIZATION WATER CONSERVATION PROJECT PHASES III, IV and V

FUNDING GROUP II APPLICATION

A water conservation project that will pipe or eliminate five open delivery sub-laterals serving 638 acres and 60 landowners in Boardman, Oregon. The Project will convert 405 acres of flood irrigation to sprinkler or drip, will install three pump stations for metered, pressurized irrigation delivery. 1986 acre-feet of water is the expected water savings of the Project.

WEST EXTENSION IRRIGATION DISTRICT
UMATILLA PROJECT
UMATILLA & MORROW COUNTY, OREGON

MAY 10, 2018

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Executive Summary

WaterSMART – Water and Energy Efficiency Grant Application

ES.1
Date: May 10, 2018
Applicant Name: West Extension Irrigation District
City, County, State: Irrigon, Morrow, Oregon

ES.2
Project Name: Boardman East – Piping and Pressurization Water Conservation Project (Project), Phases III, IV, V.

ES.3
Project Summary:
The Project will convert 4.5 miles of open lateral to buried pipe, eliminate 1.5 miles of open lateral, and provide pressurized irrigation delivery to 638 acres of irrigated land in Boardman, Oregon. This grant application is for the third, fourth and fifth phases of a multi-phased project that will enclose the open concrete-lined laterals in Boardman and convert flood irrigated acres to sprinkler. The Project will provide for efficient use of water by adopting conservation measures and installing metered pressurized deliveries. The project meets the goals of the District's Water Conservation and Management Plan. 1986 acre-feet of water will be saved annually due to the elimination of the open, concrete-lined laterals, end-spill elimination and conversion of 405 acres of flood to sprinkler irrigation.

ES.4
Project Completion: The Project will begin January 1, 2019 and be completed by December 31, 2021.

ES.5
Federal Facility: The Project is part of the West End of the Umatilla Project authorized in 1905. West Extension Irrigation District was formed in 1919 and operates the federally-owned project under its 1926 and 1954 federal contracts.

ES.6 The required Official Resolution has been approved by the Applicant's governing body and a copy has been included as a part of the proposal.
No – will be sent after the WEID Board meeting on May 17, 2018.

ES.7 Contact for further information:
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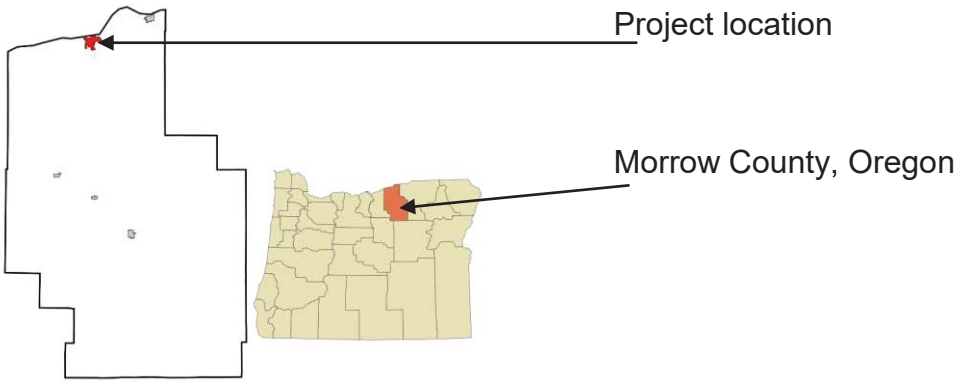
BACKGROUND DATA

B.1 Describe the geographic location.

The WEID is located in NE Oregon and covers portions of Umatilla and Morrow counties. Included in the service area are the cities of Umatilla, Irrigon and Boardman. The 9,235 acres served by WEID extend from the confluence of the Umatilla and Columbia Rivers, westward for 27 miles, to form a long, narrow irrigated band lying south of the Columbia River. It is 160 miles east of Portland, Oregon and 220 miles west of Boise, Idaho.

B.2 MAP



B.3 Provide the source of water supply, describe the water rights involved, current water uses, the number of water users served, and the current and projected water demand.

Primary Source: Umatilla River
Supplement Source: Columbia River
Return flows from McKay Reservoir
Water Use: Irrigation
Irrigators: 665
Acres Served: 9234.80

Current Water Avg. Water Demand: 37,582 Ac-ft
Projected Water Demand: 37,400 Ac-ft

The District relies on its supplemental water source from the Columbia River to meets it annual shortfall. (See tables 2 and 3 below). A portion of the saved water from the Project will be used to make up the shortfall. Any water not needed will be left in the Columbia River since it will not be pumped as supplemental water supply to meet the daily irrigation demand.

Table 1. WEID Water Right Certificates

Certificate	Permit	Priority Year	Source	Acres	Prim (P) Supp (S)	Max flow cfs	Duty Ac-ft/Ac
79924	Decree	1893	Umatilla River	1369.9	P	34.24	6
19925	Decree	1906	Umatilla River	347.1	P	8.64	6
79926	408	1909	Umatilla River	4121.7	P	295.67	10
79927	27941	1962	Umatilla River	20.0	P	.50	4.5
79928	33883	1968	Umatilla River	3248.1	P	81.20	4.5
79929	33883	1969	Umatilla River	128.0	P	3.20	4.5
79930	33883	1968	Columbia River	8516.6	S	90.0	4.5
87872	7400	1928	Return Flow McKay Resvr	5838.7	S	87.0	

Water is diverted from the Umatilla River at Three Mile Falls Dam into the 27-mile long West Extension Main Canal. As the natural and return flows in the Umatilla River decrease, the District turns on its Columbia River pumps for supplemental water.

The District is part of the Umatilla Basin Water Exchange program where water is left in the Umatilla River for fisheries purposes and is exchanged with water pumped from a federal pumping station. This is a bucket for bucket exchange.

Starting in 2014, the District began receiving reclaimed water from the City of Hermiston's Water Treatment Plant (WTP). This is Class A water. We are receiving 144 acew-feet monthly from May through October. We are working with City of Umatilla for similar water.

B.4 Identify potential shortfalls in the water supply.

The West Extension Irrigation District (WEID or District) has the lowest delivery point on the Umatilla River, being two miles above its confluence with the Columbia River. There are four irrigation districts, several small ditch companies, and private pumpers above the WEID diversion. WEID is also affected by irrigators pumping from the alluvial aquifer. Built as a federal project that relies on return flows from three upland irrigation districts, the decreasing return flows in the Umatilla River are a concern to WEID.

The District has presented several documents to the State of Oregon regarding water management of the aquifer in the Lower Umatilla Basin, alleging that well users are taking water from the alluvial aquifer that would be returning to the Umatilla River for the benefit of WEID. Nineteen wells within one mile of the river have been shut-off and discussion is ongoing relative to action regulating wells beyond one mile.

The 1988 Umatilla Basin Project introduced a federal irrigation exchange program to help alleviate water conflicts in the Basin between districts, private irrigators and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). The WEID is the main entity for Phase I of the Umatilla Basin Project's exchange program, wherein water is left in the Umatilla River for fisheries benefit. A like amount is pumped to

WEID by the Reclamation-operated Phase I pumping station. Cost of the exchange is paid by BPA.

While the exchange program has been successful in returning flows and fish to the Umatilla River, the base flows (those available to WEID for its primary source water) have continued to diminish. The District relies more and more on its supplemental water supply, which is pumped from the Columbia River. The increasing cost of pumping water is a burden to the patrons of WEID.

Below is a table showing how the availability of the District's primary source water from the Umatilla River has changed since 1980.

Table 2. West Extension Irrigation District Water Supply
Reliability of Primary Umatilla River water before and after the 1988 Umatilla Basin Project

Description	Period	Percentage Reliability of Supply to Meet Annual Use				
		25,000 afy	30,000 afy	35,000 afy	40,000 afy	45,000 afy
Prior to Umatilla Basin Project	1980-1988	100%	100%	100%	56%	22%
After Umatilla Basin Project	1988 to 2004	93%	93%	47%	13%	0%
Last 16 Years	2000 to 2016	80%	27%	0%	0%	0%

Note: Reliability calculated as number of years specified water use was met divided by total years during specified period.

Table 3. Actual water use – Five years 2013-2017

	2013	2014	2015	2016	2017
PRIMARY SOURCE:					
Umatilla River	6989	8570	3420	4814	7770
Exchange	19220	18961	17670	18828	16820
TTL PRIMARY:	**26209**	**27531**	**21090**	**23642**	**24590**
Primary %	**74%**	**72%**	**57%**	**62%**	**71%**
SUPPLEMENTAL SOURCE:					
Phase One	7081	10678	16100	13985	9283
UPS/Herm WTP	2351	0	0	300	776
TTL SUPPLEMNTL:	**9432**	**10678**	**16100**	**14285**	**10059**
Supp %	**26%**	**28%**	**43%**	**38%**	**29%**
Total	**35641**	**38209**	**37190**	**37927**	**34649**
Acres	**9136**	**9193**	**9205**	**9235**	**9235**
A/F	**3.90**	**4.16**	**4.04**	**4.11**	**3.75**

In drought year 2015, a total of 37,190 acre-feet of water was delivered to the patrons of WEID. Of this, 16,100 acre-feet (43.0%) was supplemental water. The means that, in 2015, only 57 % of its annual water supply was available from the Umatilla River. The concern for WEID management is that we have tapped the upper limit of our water rate even with rotation practices in place. We must increase our efforts to conserve water.

Table 4. Summary of Crop Demand Vs Available Water (based on 15-year records)

	Current Demand based on crop needs	Current Available/All sources
Avg. Max Monthly (Ac-ft)	10,091	7,350
Avg. Max Delivery Rate (cfs)	164.0	135.0
Avg. Annual (Ac-ft)	37,582	37,200
Peak Monthly (Ac-ft)	11,495	7,500
Peak Delivery Rate (cfs)	187.0	147.0
Peak Annual (Ac-ft)	41,683	39,500

The District cannot meet the demands of its irrigators during the heat of summer. Irrigators are on rotation.

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) are negotiating their water right settlement with the federal government. We do not know how the settlement will affect us. Continuing our water conservation efforts is the best way to prepare for any additional water loss.

The District has tightened up its management installing meters on all deliveries 20 acres and over. We have hired additional seasonal staff to regulate water and to educate irrigators in their conservation efforts.

The next obvious place to go is to address the 20% loss in the open canal system due to evaporation, seepage, and operational drains and to convert all flood irrigation to sprinkler or drip. This is the area the District has started addressing by piping open laterals (see Table 6 below).

B.5 List type of use of water, describe major crops and total acres served.

All water is used for irrigation.

Table 5. Crops grown in the WEID.

Crop	Acres	Percentage
Pasture	2,842.40	30.8%
Alfalfa / Hay	2,100.40	22.7%
Corn	1,677.30	18.2%
Potato	548.40	5.9%
Onion	333.10	3.6%
Beans / Peas	117.70	1.2%
Mint	80.70	.9%
Spring Grain	171.60	1.9%
Apple / Peach	43.90	.5%
Melons / Berries	380.00	4.1%
Fallow	108.30	1.2%
Lawn / Non-Ag	831.00	9.0%
TOTAL	9,234.80	100%

B.6 Describe the applicant's water supply system. For agricultural systems, please include the miles of canals, miles of laterals, existing irrigation improvements (i.e. type, miles, and acres).

Water is diverted at Three Mile Falls Dam which is located about two miles upstream from the mouth of the Umatilla River. Water is then gravity-fed into the District's main feature – it's 27-mile long concrete-lined main canal. There are sixteen booster stations along the canal and over 120 deliveries off the main canal. Many deliveries are piped and gravity-fed and there are 18 open laterals. Pipelines and ditches total 40 miles.

Diversion facilities also include a pump station on the Columbia River that provides supplemental water to the WEID. A second Columbia River pump station is federally owned and operated, by the Bureau of Reclamation and is part of the Umatilla Basin Exchange program. Both pump stations pump water directly into the WEID main canal.

See Figure 1 – WEID System Map in attachments.

Table 6. Types of On-Farm Irrigation Systems

Irrigation Type	Acres	%
Drip	338.8	3.6
Flood	2207.7	24.0
Set Sprinkler	3025.6	32.7
Center Pivot Sprinkler	3662.7	39.7
TOTAL	9234.8	

The final nine miles of the 27-mile long main canal deliver water to the Boardman area. The Boardman area accounts for 4,548 acres (49% of District) and has 35% of the District landowners. 46% of the Boardman Project area is flood-irrigated. The Boardman laterals are mainly open channel. The District has piped two of its open laterals and will pipe a third this fall. These were the first two phases on the Boardman PIping and Pressurized Water Conservation project.

Economic activities over the past 15 years have seen an increase in land development in Boardman. Five of the 20 - 40 acre parcels that previously existed have been converted to two-acres parcels. About 60% of the District-served acres in Boardman are zoned R-2 (2-acre rural lots). Over the past two years, with the large dairy farms and growing hay industry, folks are moving to Boardman and land development has increased. Folks are looking for two to five acres parcels where they can site a home and raise their family. Boardman offers this opportunity in an agricultural community.

This Boardman Lateral Conversion and Conservation Project will provide a foundation for land development and water conservation in Boardman by enclosing the open laterals and installing efficient pressurized pumping stations for delivery to developed acres. All deliveries in Boardman will be sprinkler or drip irrigated and will be metered.

This Project will pipe Boardman Laterals 12, 15 and 17. 331 acres of land will be converted from flood irrigation to sprinkler or drip. Because all three laterals currently have both flood and sprinkler delivery, there are operational spills season-long. These operational spills, seepage losses and evaporation losses will be eliminated. Water savings for this Project is estimated to be **1986 acre-feet** annually.

Table 7. Conservation Projects Completed Years 2000 – 2017 Main Canal / Laterals

Service Area Description	Comments	Pipe Details (Feet)	Cost of materials (no labor)	Estimated Savings	Year Completed
Sunrise Hamilton, Donovan McGraw (210 Ac) Bonner	Development converted land from flood to sprinkler		Unknown – Developer cost	570 AF	2001 - 11
Philippi (570 Ac)	Convert from flood to sprinkler irrigation		Unknown – Landowner cost	2100 AF	2001
Main Canal	Data Loggers, weirs in laterals, automated gates and SCADA		$222,386	Water Accounting	2001-02
Main Canal	Automated gates and SCADA		$577,525	Water Accounting	2003-06
County Line Project (35 Ac)	Replace concrete line/ Convert from flood to sprinkler	1800 ft. 6”	$4,500	80 A.F.	2005
Main Canal (4373 Ac)	Landowner Meters	132 meters		300 AF	2004 - 06
Depot Lane	Replace open lateral system	3800 ft. 6”-12”	$72,000	150 AF	2004
Cleaver (432 Ac)	Convert from flood to sprinkler	4200 ft. 8”	Unknown Landowner cost	880 AF	2008 - 2010
RL 1 & RL4	Replace old and install valves/meters	1920 ft. 8” & 12”	$14,700	25 AF	2009
RL 2	Replace open lateral/install VFD booster station.	2820 ft, 4” – 10”	$63,000	200 AF	2010
Lateral 79 (40 AC)	Convert from flood to sprinkler	2200 ft 8 “	$7500 pipe Landowner installed	140 AF	2013
Lateral 78 (68 AC)	Convert from flood to sprinkler	1,500 ft 8”	$6,500 pipe Landowner installed	170 AF	2014
Irrigon/Boardman	Installed VFDs on existing pump stations & add irrigators to existing pump station for efficiency		Varies $6500 - $8,000	60 AF	2013-2014
Stiffler LLC (80 AC)	Purchase and convert land from flood irrigation to drip For blueberry farm		Unknown – Landowner cost	360 AF	2013-2015
Boardman Project Phase IA	Pipe Lateral 7 and meter deliveries	4860 ft 6” – 21”	$191,167	435 AF	2016
Boardman Project Phase II	Pipe & pressurize Lateral 9, convert 84.5 flood acres to sprinkler, meter deliveries	4560 ft 6” – 15”	$167,152	278 AF (est)	2017

B.7 Describe current energy uses relative to energy efficiency elements of Project.

Currently, most landowners in Boardman either flood or pump out of the canal or lateral. Those pumping out of the canal have their own irrigation pump. The District's development policy requires a developer to install a VFD pump station for the entire development. It will be installed to District's specifications and the District will assume responsibility for operation and maintenance of these pump stations after a warranty period. Six pumping stations serving approximately 40 acres each have been developed in recent year. The variable frequency drives (VFD) provide energy savings.

In 2016, the District began piping the open sub-laterals. The Board of Directors decided to pressurize these systems to save energy in the District. The energy savings that resulted or will result are:

Phase IA – Piping lateral 7. Two large landowners are reporting over $1000 savings in energy costs due to the pipeline. A subdivision is served with a single pump station. Two 10-acre farms are receiving 30 psi at their outlets and have not installed a booster pump.

Phase II – Piping lateral 11. A 50 HP VFD pump station has just been completed for this lateral. It will provide pressurized water to all 157.9 acres starting with the 2018 irrigation season. Two pumps were eliminated on this project and seven other landowners can develop their property without need to install a pump.

Phase IB – Rippee Road E & W project. This completes Phase I by adding pipe to the Phase I pipe listed above that will eliminate open lateral No. 5. It also will enclose Lateral 9 and provide a pumping station with VFD to delivery water to 171.6 acres. Five small pumps will be eliminated in this project.

For the project being considered in this grant, three pumping stations (from 65 HP to 80 HP) will be installed with variable frequency drive systems. 15 current pump stations (ranging from .5 HP to 30 HP) will be eliminated and pressurized delivery will be provided to 45 owners that are currently flood irrigating. Thus the potential for 60 individual pumps will be eliminated. All deliveries will be metered.

B.8 Briefly, identify any past working relationships with the Bureau of Reclamation including any previous grants. Include the dates, relationship and the projects.

West Extension Irrigation District (WEID) is a federal project, authorized in 1905 and built in 1914-1916. The WEID has a 1926 O&M contract and there is a 1954 repayment contract with final payment due in 2061.

Water Conservation Field Services Grant. Purpose of the Grant was to convert the district's water rights management system to GIS. The grant was effective September 10, 2008 and completed December 31, 2011. Amount of grant was $12,915.

Water 2025 Grant System Optimization Review. Purpose of the Grant was to conduct a system optimization review and to prepare a water management and conservation plan for West Extension Irrigation District. The grant was effective September 10, 2008 and completed December 31, 2011. Amount of grant was $22,000.

Multi-Year grant funded under the Fish and Wildlife Coordination Act for Water Conservation Implementation Assistance. This grant became effective May 1, and was completed December 31, 2006. The District installed three Langeman automated gates, added three stations to its SCADA system, rebuilt two ramp weirs, installed nine data loggers, installed a fish barrier system on its drain, and installed 200 landowner water meters under this grant. The Grant was for Canal Control, Measuring and Metering. The total amount was $245,000.

Prior to that, in 1999-2001, the District had two grants from Reclamation. One was for preparation of the District's water conservation plan in the amount of $12,000. The second was for purchase and installation of a SCADA system with five stations and an automated gate at the District's end spill near Boardman. Total amount of this grant was $85,000.

WEID is a partner with Reclamation, the local fish agencies, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Bonneville Power Administration (BPA) for Phase I of the 1988 Umatilla Basin Act. Water is pumped from the Columbia River to the WEID main canal by Reclamation (pumping cost paid by BPA). WEID leaves a like amount of water in the Umatilla River, a tributary to the Columbia River, to benefit the fisheries. This is a bucket for bucket irrigation water exchange that exchanges 16,000 – 20,000 acre-feet of water annually for the benefit of the fisheries resource. The CTUIR and local fisheries agencies manage the fish water for the exchange program.

FY 2008-2016 The District and Reclamation worked with the City of Hermiston to allow for reclaimed or reuse water to enter the irrigation canal. Overview by EPA, Oregon Department of Environmental Quality, Oregon Water Resources Department and the fisheries agencies was part of this process.

FY 2015-2016 Field Conservation Services Grant. This grant assisted the District in Phase I of the Boardman Lateral Conversion and Conservation Project (now called Boardman Piping and Pressurization Water Conservation Project). The project piped Lateral 7 and eliminated the northern part of Lateral 5. Total cost of this project was $191,167, including District labor and equipment. Grant amount was $25,000. Project was completed May 1, 2016.

FY 2016-2018 Field Conservation Services Grant. This grant assisted the District in Phase II of the Boardman Piping and Pressurization Water Conservation Project. The project piped Lateral 9. The project start was delayed due to the review of the Oregon State Historical Office. Total cost of this project was $107,152. The District spent another $60,000 when it installed a variable frequency drive pump station that will deliver pressurized water to the landowners on this system starting in 2018. The federal grant project was completed December 30, 2017.

FY 2018-2019 WaterSMART Small-Scale Water Efficiency Project. The contract for this grant is in the process of being drawn up. It will complete Phase I of the overall Boardman project by eliminating the rest of the irrigators off Lateral 5 and providing pressurized delivery to the irrigators off Lateral 9. Completion date for this project is April 1, 2019.

TECHNICAL PROJECT DESCRIPTION

The District currently has a mixture of flood, gravity flow and pressurized irrigation service. The main canal has 120 turnouts or headgates that feed ditches or pipes to convey the water. The water is applied to the crops via pressure systems (pivot, handlines, sprinklers), or by flood irrigation.

Since the mid 1950's, the District has had a difficult time getting enough water to its customers during the peak summer months. Delivery losses on the open system are a contributing factor. There are water shortages in the over-allocated Umatilla River. Insufficient flows in the Umatilla River decrease the volume that WEID can divert into its Main Canal. The decreased flow in the Umatilla River is thought to be caused by significant reductions in return flows from upstream irrigation and increased pumping by groundwater users in the alluvial aquifer.

The District needs to optimize its delivery system. At first, the focus of the District was measurement and informational efforts such as education, metering and SCADA. Five years ago, the District changed its focus to piping its remaining open laterals in Boardman for actual "on-the-ground" water savings.

The WEID developed its Boardman Master Plan (BMP) in 2004 and updated it in 2015. The purpose of the BMP is to plan for growth in the Boardman area, to prioritize District activities, to obtain conservation funding and to provide information to irrigators and developers. The recommendations are based on zoning classifications, irrigation demand calculations, modeling, engineering judgment, and discussions with landowners.

The WEID adopted its Water Management and Conservation Plan (WMCP) in December 2011. It not only meets the requirements of the State of Oregon and Bureau of Reclamation for such a document, but is an excellent resource for the District for current and future management activities. The WMCP quantified the water savings that could be gained from various piping projects and prioritized the projects. Laterals 15 and 17 were identified as high priority projects. Lateral 12/13 is a medium priority. The WMCP consists of five main elements or Chapters:

Water Supplier Description
Water Conservation Element
Water Curtailment Element
Water Supply Element
System Optimization Review

EVALUATION CRITERIA

E.1.1 Evaluation Criterion A: Quantiable Water Savings (30 points)

*Up to **30 points** may be awarded for this criterion. This criterion prioritizes projects that will conserve water and improve water use efficiency by modernizing existing infrastructure. Points will be allocated based on the quantifiable water savings expected as a result of the project. Points will be allocated to give greater consideration to projects that are expected to result in more significant water savings.*

Describe the amount of estimated water savings. For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project.

The water savings will be **1986 acre-feet** annually.

Describe current losses: Please explain where the water that will be conserved is currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?

Water will be conserved by:

- Eliminating seepage and delivery losses in the open sub-laterals. This water is currently going to ground. The area has shallow soils, so it becomes drainage or run-off water, entering County ditches eventually.
- Eliminating tailwater losses. Tailwater is currently going through a series of drainage ditches onto County or State rights-of-way.
- Converting 405 irrigated acres from flood to sprinkler irrigation method.

Describe the support/documentation of estimated water savings: Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. for a full review of your proposal.

Ponded water loss rate tests were conducted on several open ditch laterals during October of 1994 and reviewed in 2007 by the District engineer. Laterals were a conglomerate of concrete and earth canals in varying condition. Seepage loss rates ranged from 0.01 to 0.10 cfs per 1,000 feet. This data was applied by the engineer based on field investigations to each lateral on the basis of whether the ditch condition was considered “good” (0.01 cfs/1,000ft), “Fair” (0.055 cfs/1,000ft), or “Poor” (0.1 cfs/1,000ft).

For example, a section of the lateral on Headgate #15 was given a seepage rate of 0.2 cfs/1,000 ft. This lateral in particular has been known to have high seepage loss rates where part of the canal travels underground, then re-emerges downstream.

Average evaporation estimates were taken from historical pan evaporation rate data from the Hermiston weather station.

Technical Table 1 was prepared by the District's engineer and lists the estimated operations, seepage, and evaporation losses for each lateral affected by the project.

Technical Table 1 – Quantifiable Water Savings in Acre-feet (AF) for the Project area

Lateral	Existing Length Feet	Op Loss AF / Day	Seepage Loss AF / Day	Evap Loss AF / Day	Total Loss AF / Season
12	3500	< 0.1	0.10	< 0.1	20.0
13	800	0.20	0.15	< 0.1	68.0
15	8500	0.35	0.45	< 0.1	156.0
17	4900	1.80	0.45	< 0.1	401.0
18	4900	0.20	0.45	< 0.1	126.0
				TOTAL	**771.0**

By piping or eliminating these laterals, the District expects to conserve **771 acre-feet**.from operational losses.

Conversion from flood irrigation to sprinkler or drip irrigation will conserve an average of 3.0 acre-feet annually per acre. There are 405 acres being converted from flood irrigation for an annual savings of **1215 acre-feet.**

Flood water takes 7.5 AF during the season. Average sprinkler irrigation in Boardman is 3.5 acre feet, based on meter readings. Some flood land has been idled or poorly irrigated, so we are using 3.0 af per acre in our calculation for water savings due to conversion from flood to sprinkler.

Water savings from operational losses	771 acre-feet
Water savings from flood delivery conversion	1215 acre-feet
TOTAL AF SAVED ANNUALLY	**1986 acre-feet**

Please address the following questions according to the type of infrastructure improvement you are proposing for funding.

(1) Canal Lining/Piping: Canal lining/piping projects can provide water savings when irrigation delivery systems experience significant losses due to canal seepage. Applicants proposing lining/piping projects should address the following:

a. How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.

The methodology for measuring the estimated annual water savings that will result from the project is explained above Technical Table 1 Quantifiable Water Saving shown above. The amount of conserved water is a combination of reduced

operational spills, reduced evaporation and transpiration, and reduced loss of water to the groundwater supply due to flood irrigation. See Tech Table 1 above for calculations of operational loss. Flood conservation will be 3.0 acre-feet per acre, which is an average, based on experience and knowledge of the system. There are 405 acres in the Project currently flooded that will change to pressurized irrigation.

b.How have average annual canal seepage losses been determined? Have ponding and/or inflow or outflow tests been conducted to determine seepage rates under varying conditions? If so, please provide detailed descriptions of testing methods and all results. If not, please provide an explanation of the method(s) used to calculate seepage losses. All estimates should be supported with multiple sets of data/measurements from representative sections of canals.

Ponded water loss rate tests were conducted on several open ditch laterals during October of 1994 and confirmed by the District engineer in 2007. Laterals were a conglomerate of concrete and earth canals in varying condition. Seepage loss rates ranged from 0.01 to 0.10 cfs per 1,000 feet. This data was applied to each lateral on the basis of whether the ditch condition was considered “good” (0.01 cfs/1,000ft), “Fair” (0.055 cfs/1,000ft), or “Poor” (0.1 cfs/1,000ft). evaporation estimates were taken from historical pan evaporation rate data from the Hermiston weather station.

c. What are the expected post-project seepage/leakage losses and how were these estimates determined (e.g., can data specific to the type of material being used in the project be provided)?

The post-project seepage/leakage losses are expected to be minimal since the entire length of each lateral will be piped. The water provided to each pump station from the main canal will be metered using a master meter. In addition, each delivery will be metered. Any seepage or leakage from the pipeline will be determined by calculating the difference between the master meter at the pump station and the total of the meters at each delivery. The amount of seepage/leakage from the new system is expected to be at or near zero.

d. What are the anticipated annual transit loss reductions in terms of acre-feet per mile for the overall project and for each section of canal included in the project?

The Project will replace or eliminate 5.4 miles of open channel. As a result, the project annual transit loss reduction will be 134 acre-feet per mile.

e. How will actual canal loss seepage reductions be verified?

The canal seepage reductions will be verified as part of the overall Project evaluation using pre-project District records. These consist of actual SCADA information, weir readings and ditchrider logs. A ponding test will be done in 2018 to confirm current seepage loss calculations. The new Project will be metered at deliveries and pump stations. Comparing the pre-project records to the post-project records will verify the total amount conserved.

f. Include a detailed description of the materials being used.

The materials being used for the project include PVC and Ductile Iron pipe, pipe, flow meters, pumps, filters, drum screen, concrete, valves, and associated fittings. A detailed description of the main components used in the project listed noted below:

- 24,200 feet of PIP or IPS pipe ranging from 4-inch to 15-inch
- 7 road crossings using HDPE pipe
- 20 AWWA gate vales from 8-inch to 14-inch
- 3 new pump stations from 50 – 80 HP with variable frequency drives, filters, meters, shed
- 56 service or delivery valves from 1.5 to 6 inches
- 56 meter assemblies for the deliveries
- Three rotating screens in the main canal for weed

All valves, reducers and tees meet AWWA standards.

2) **Municipal Metering:** Not applicable.

(3) Irrigation Flow Measurement: Irrigation flow measurement improvements can provide water savings when improved measurement accuracy results in reduced spills and over-deliveries to irrigators. Applicants proposing municipal metering projects should address the following:

a. How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data.

Tech Table 1 provides information to show how the baseline (current loss) was determined in the WMCP. The District engineer's calculations were based on ponding, information from District personnel, and end spill observations. The District will confirm the seepage and end spill calculations in 2018 by conducting ponding tests and taking daily measurements at end spills.

The Project will install metered deliveries. Monthly records will be kept on the deliveries and an annual report will be prepared. Comparing the pre-project condition with the post-project condition will provide annual water savings amount.

b. Have current operational losses been determined? If water savings are based on a reduction of spills, please provide support for the amount of water currently being lost to spills.

Losses were determined and project priorities set as part of the WCMP. The ditchrider monitors end spills daily. We have weirs at the head of the sub laterals and most irrigators are measured through their delivery records or a meter. Annually, the water turned into each lateral can be compared to the amount of water used by the irrigators.

c. Are flows currently measured at proposed sites and if so what is the accuracy of existing devices? How has the existing measurement accuracy been established?

The District has a SCADA system for Laterals 15 and 17. Weir box are at the head of Laterals 12, 13 and 18. The flooders on the ditches have a specific time of irrigation and records are kept by the ditchriders. The accuracy of the SCADA is 95%. The weir boxes vary because the ditch level rises and falls throughout the day. Thus, best estimates by district management using ditchrider records and schedules are used. Accuracy is estimated at 80%.

d. Provide detailed descriptions of all proposed flow measurement devices, including accuracy and the basis for the accuracy.

All deliveries will be metered using either a Hersey meter or a McCrometer meter.
The District's meter standards and specifications are:

Ability to measure non-potable water – clean and dirty flows
Accuracy of +/-2%
Repeatability of +/-0.25%
Self-cleaning design.
Instantaneous flowrate indicator measured in gpm
Anti-reverse totalizer measuring in acre feet.

The meter shall meet these specifications and be AWWA approved standards for cold water use.

e. Will annual farm delivery volumes be reduced by more efficient and timely deliveries? If so, how has this reduction been estimated?

Conversion from flood to sprinkler irrigation of 405 acres will reduce delivery volumes. Average flood irrigation in Boardman is 7.5 acre-feet annually. Average delivery in this area is 3.5 acre-feet annually. There are 45 flood acres that currently are not taking water and another 20 acres that have sketchy practices. Our estimate is an average of 3.0 acre-feet per acre savings, which may be conservative.

f. How will actual water savings be verified upon completion of the project?

The water savings will be verified by comparing pre-project water use from ditchrider and SCADA records to post-project water use using meters. There is a master meter on each system plus individual delivery meters.

E.1.2 Evaluation Criterion B: Water Supply Reliability

(18 points)
Up to 18 points may be awarded under this criterion. This criterion prioritizes projects that address water reliability concerns, including making water available for multiple beneficial uses and resolving water related conflicts in the region.

Please address how the project will increase water supply reliability. Proposals that will address more significant water supply shortfalls benefitting multiple sectors and multiple water users, will be prioritized. General water supply reliability benefits (e.g., proposals that will increase resiliency to drought) will also be considered. Please provide sufficient explanation of the project benefits and their significance. These benefits may include, but are not limited to, the following:

Does the project promote and encourage collaboration among parties in a way that helps increase the reliability of the water supply?

Is there widespread support for the project?

Yes. Regionally, the problems with WEID's decreasing water supply and its return flow reductions are important in the Umatilla Basin. The Oregon Water Resources Department is aware and has considered return flows as part of their Basin oversight for the past 12 years. During the CTUIR water right settlement discussions, the protection of return flows for WEID are part of the conversation. Already, nineteen wells are shut off and the District is looking for more water.

As the District has made its case in the Umatilla Basin for the protection of return flows, it is also aware that it has to do its own part to conserve water. This project will reduce the District's water demand and is an important part of allowing the District to shore up its water supply.

The WEID works cooperatively with Umatilla Soil and Water Conservation District and Morrow County Soil and Water Conservation District to promote their programs. These efforts include on-farm scheduling assistance and workshops.

What is the significance of the collaboration/support?

Working together creates awareness and incorporates a spirit of accomplishment. The District uses its website and newsletters to keep its patrons informed. Good communication is important.

Basinwide, there is continued focus on working together to address water issues without litigation. WEID is an active member of the Northeast Water Association and the Oregon

Water Coalition. Both local entities focus on addressing surface and ground water issues and conflicts in the Basin.

Working with the local Soil and Water Conservation Districts provide technical information for our patrons and access to their funding pools.

Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?

Yes. As other water users realize how the pressurized system will enhance their own property and likely increase its value, they will become more interested in such a project for their lands. Currently, they are concerned about the cost and how it will work. Remembering that the lower portion of our district is completely flood irrigated and has been for over 100 years, better puts this in perspective. These folks have built their lives around that type of irrigation and its schedule. It will be a change for them. But, as they see others adapting, so will they.

Will the project make water available to address a specific water reliability concern?

Please address:

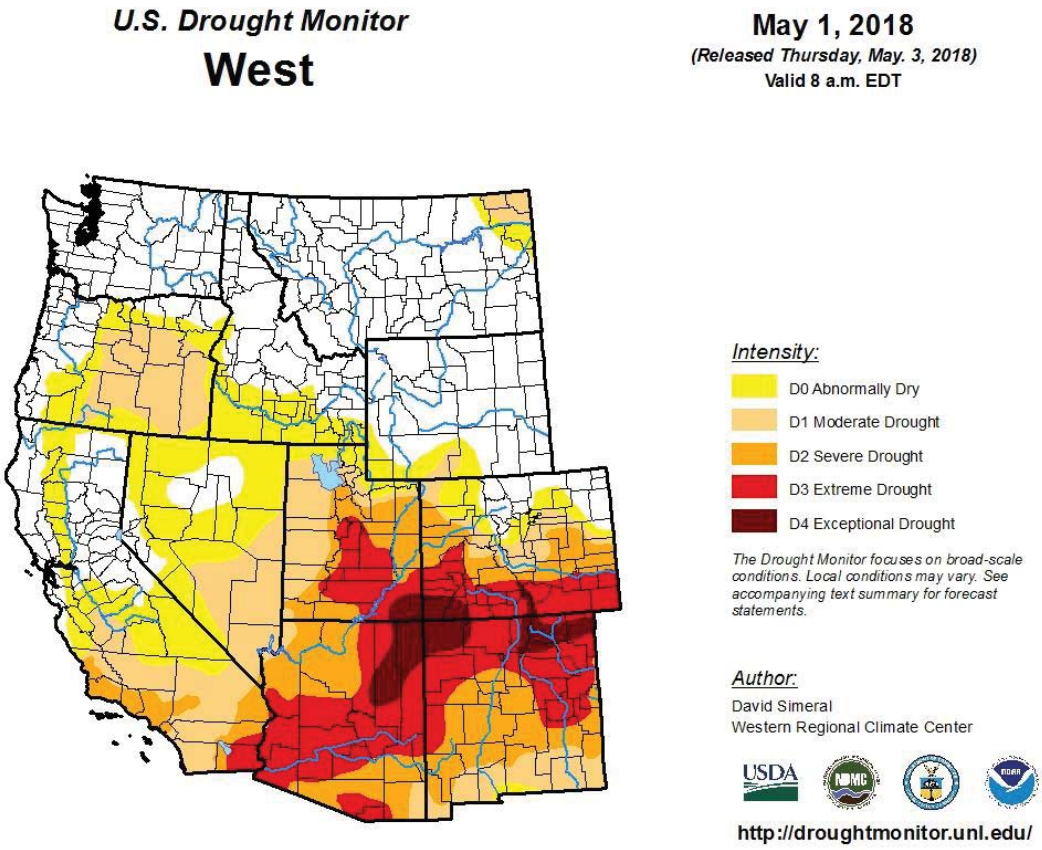
Explain and provide detail of the specific issue(s) in the area that is impacting water reliability, such as shortages due to drought, increased demand, or reduced deliveries.

Although we are not currently in a drought pattern, drought in often part of the landscape in this desert region. The Umatilla River is particularly impacted by lack of rain and snow pack as this is not a mountainous area of the State. Seasonal high temperatures, limited flows in the river and high degree of water allocation make water short starting as early as May each year.

For the majority of the year, but especially in drought years, the District is required to obtain a significant amount of their water as supplemental water pumped from the Columbia River. In 2015 and 2016, the District peaked at its rate of water available under its water right certificates.

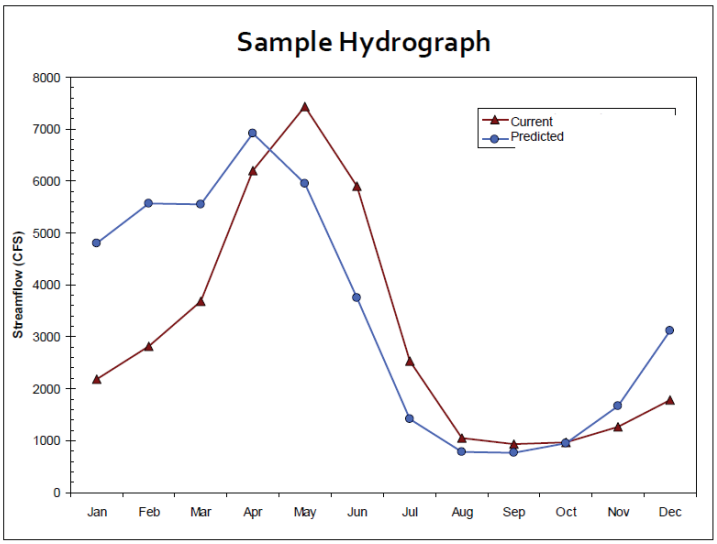
SEE CURRECT DROUGHT MAP BELOW, FIGURE 1

Figure 1



Also impacting dry or drought conditions are the effects of climate change. While all of the impacts of climate change are not known, it is clear that Northeast Oregon and the entire Columbia Basin drainage is receiving less precipitation, especially in the form of snow. It appears that the timing of the precipitation has moved to later in the spring which also negatively impacts irrigation supplies. As noted in the Districts Water Management and Conservation Plan (WMCP), the effects of climate change could be devastating. Oregon's Integrated Water Resources Strategy (IWRS) shows the dramatic changes in flow regime in a hypothetical stream in Oregon in the figure below. The temperature rise will reduce winter snow pack that provides natural storage and will cause earlier outflow of rain water and melt water from the basins. Based on this graph, the hydrograph peak is predicted to occur earlier in the season, perhaps by as much as approximately one month earlier, than currently observed.

Figure 2. Hydrograph from State of Oregon's IWRS



The rise in air temperature in the Umatilla Basin is expected to change the flow regime (flow rate and timing) and stream flow availability to the District during the irrigation season. The flow regime is currently suitable to provide the District's water during the early season with declining availability in later months. Estimates indicate the peak of demand is during May of each season with high demand continuing in June and July. A shift of the river flow hydrograph to earlier months will exacerbate the District's water shortage problems.

The climatic changes will also result in a longer growing season causing the total irrigation water demand to increase and also changing the timing of crop water need relative to availability. Moreover, there will be additional pressure on water use throughout the basin causing reductions in irrigation return flow on which the District so critically depends.

The IWRS does not provide specific predictions of the timing and extent of the rise in temperature and the resulting changes in stream flow in various parts of Oregon. The District is noticing farmer practices of earlier cropping however. The next 20 years will provide the necessary time frame within which the members' water uses and District's water delivery practices will be improved to be as efficient as possible.

This Water SMART Grant application and Project is one important step in the District reducing its drought risk. The grant will improve the reliability and consistency of the water supply, especially during drought years. By reducing drought risk, the District will decrease the possibility of crop loss due to drought. In addition, this important conservation project will help preserve the limited water supply for irrigation, wildlife, and the environment.

Describe where the conserved water will go/how it will be used. Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)? Will it be left in the river system?

The conserved water will first go to help shore up the District's water supply and met its demand. The District puts it water users on rotation all year. This is a good way to manage water for the smaller water user. It has an impact on the farmers and their production. Having a reliable and consistent water supply will be important to them. If the District demands are met, the water will be left instream. We anticipate this will occur often during the season. By conserving water, we are reducing demand making water available to enhance fisheries flows.

Describe how the project will address the water reliability concern?

Will the project help to prevent a water-related crisis or conflict? Is there frequently tension or litigation over water in the basin?

There is tension over water in the Basin. The CTUIR Water Right settlement is a threatened legal concern in Umatilla. In 2014, the State of Oregon was sued by an upstream District over its certification of a return flow certificate for water from McKay Reservoir for the WEID. That valid water right certificate is currently in abeyance while we work out protocol issues for the State of Oregon to allocate that water to the WEID. An upstream irrigation district is currently being sued by its patrons over allocation of water within their District.

Shoring up its water supply in every way possible is the best way for the WEID to address water crisis and conflicts.

Provide a description of the mechanism that will be used, if necessary, to put the conserved water to the intended use.

No special consideration is necessary. The water will either be used within the District or will stay instream. It will not need to be protected or measured as we are the lowest delivery on the Umatilla River.

Describe the roles of any partners in the process. Please attach any relevant supporting documents.

Not applicable.

Indicate the quantity of conserved water that will be used for the intended purpose.

All the conserved water will be used for its intended purposes, so 1986 acre-feet.

Will the project benefit Indian tribes?

Yes. Any water left in the river will be for fisheries benefit, which benefits the CTUIR.

Will the project benefit rural or economically disadvantaged communities?

Yes. The Boardman area is a small agricultural area. The growth of the Port of Morrow (including Tillamook Cheese Plant, data processing centers, and the ag processing industry) and the expansion of the Three Mile Dairy Farm facility just west of Boardman are adding to the necessity of Boardman to develop and address its housing needs. Some of the smaller farms are dividing into two-acre lots and more is expected. Piping the laterals will make it easier for growth to occur and for those future landowners to receive their water. District policies already require the properties to provide community irrigation systems when they develop. The 2010 census identified a Hispanic or Latino population in Boardman of 61.7%.

Groundwater contamination problems: According to Oregon DEQ's Lower Umatilla Basin Groundwater Investigation, local activities in the area – such as irrigated agriculture, livestock operations, domestic sewage and other – have contributed to the degradation of area groundwater. The ODEQ declared the lower Umatilla Basin a "Groundwater Management Area" in 1990 when groundwater sampling during the mid-1980's found high nitrate concentrations in local groundwater. They found that irrigated agriculture is the dominant land use in the basin. Estimates indicate that irrigated agriculture releases the most nitrogen to the basin's land surface. Poor irrigation techniques, such as flood irrigation and seepage, are a contributor to the problem, along with many other factors. Enclosing the open laterals and converting land from flood to sprinkler irrigation will make the canal water less available to affect the nitrate and groundwater issues in Boardman.

Will the project benefit species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance). Please describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project.

As part of the Umatilla Basin Exchange Program, which is monitored in the Basin by the Bureau of Reclamation and funded by BPA, the District is very aware of the benefit of leaving water instream for fish. Under the 1988 Umatilla Basin Project Act (P.L. 100-557), facilities were constructed to improve passage and restore instream flows for anadromous fish while allowing established irrigation to continue. These facilities included fish screens at Maxwell Diversion Dam, fish screens and a ladder at Feed Canal Diversion Dam, and construction of water exchange facilities (Phases I and II) to deliver irrigation replacement water from the Columbia River.

The Phase I water exchange facilities serve the WEID. Construction began in January 1990 and was completed in 1993.

The Phase II water exchange facilities serve HID and SID. Construction of Phase II facilities began in June 1993 with the Columbia River Pumping Plant (CRPP) and Discharge Line; all facilities were completed in 1999.

This has been a successful program by increasing water supply in the Umatilla River. The fish are returning to the Umatilla River. The CTUIR and local fisheries agencies run the "on-the-ground" part of the program, also funded by BPA.

Will the project address water supply reliability in other ways not described above?

Yes, by piping the open laterals and eliminating flood irrigation, water will be available to the users every day. Currently, flood irrigators get water every 14 days. This change in their water supply will increase the productivity of their acreage.

E.1.3: Evaluation Criterion C—Implementing Hydropower (18 points)

Hydropower is not a part of this Project.

E.1.4: Complementing On-Farm Irrigation Improvements (10 points)

*Up to **10 points** may be awarded for projects that describe in detail how they will **complement on-farm irrigation improvements** eligible for NRCS financial or technical assistance.*

Note: Scoring under this criterion is based on an overall assessment of the extent to which the WaterSMART Grant project will complement ongoing or future on-farm improvements. Applicants should describe any proposal made to NRCS, or any plans to seek funding from NRCS in the future, and how an NRCS-funded activity would complement the WaterSMART Grant project. Financial assistance through the Environmental Quality Incentives Program (EQIP) is the most commonly used program by which NRCS helps producers implement improvements to irrigation systems, but NRCS does have additional technical or financial assistance programs that may be available. Applicants may receive maximum points under this criterion by providing the information described in the bullet points below. Applicants are not required to have assurances of NRCS funding by the application deadline to be awarded the maximum number of points under this sub-criterion. Reclamation may contact applicants during the review process to gather additional information about pending applications for NRCS funding if necessary.

A letter of support from NRCS is enclosed as Attachment A.

If the proposed project will complement an on-farm improvement eligible for NRCS assistance, please address the following:

• Describe any planned or ongoing projects by farmers/ranchers that receive water from the applicant to improve on-farm efficiencies.

Provide a detailed description of the on-farm efficiency improvements.

Following is a list of landowners and acreage that are eligible for NCRS funding and assistance to improve on-farm deliveries. They will convert their water delivery from flood to irrigation and reduce their on-farm delivery from 7.5 acre-feet to approximately 3.5 acre-feet per acre annually. They will work with NCRS for funding and technical assistance.

Name	Acres	Current Irrigation	Current Use of land
Brown	11.8	Flood	Pasture, grazing
Marston	56.0	Flood	Pasture, grazing
Holmes	38.0	Flood	Pasture, grazing
Broadbent	19.5	Flood	Pasture, grazing
Hug	9.4	Flood	Pasture, grazing
Madrigal	7.6	Flood	Pasture, grazing
Lopez/Mendelez	56.8	Flood	Pasture, grazing
Marquardt, Hughes	16.5	Flood	Non-farmed
Lands	17.5	Flood	Pasture, small orchard
Baldock	35.7	Flood	Pasture, alfalfa
Bither	19.1	Flood	Pasture, grazing
Sayles	8.3	Flood	Pasture
Alvarez	4.6	Flood	Pasture
Calvillo	5.0	Flood	Pasture
Muriillo	26.7	Flood	Pasture, grazing
Rahier	7.5	Flood	Pasture, grazing
Lands	7.0	Sub-irrigated	Pasture, grazing

Describe in detail the on-farm improvements that can be made as a result of this project. Include discussion of any planned or ongoing efforts by farmers/ranchers that receive water from the applicant.

Many of the flood irrigators identified above have high groundwater. This Project will allow them to convert to sprinkler irrigation and have better management of the water on their property. If they decide to install drainage on their property, the District will work with them to accept the drainage water as reuse back into the District's system. Taking this step will allow for the ground to be used for a higher value crop such as corn.

Morrow Soil and Water Conservation District (MSWD) has applied for a grant to assist the water users on this project under their Conservation Implementation Strategy. The goal of their grant is to address inefficient water use, inefficient energy use and impaired water quality with the Project under this grant application. The amount applied for is $800,000. The time frame matches that of this WaterSMART Grant.

Have the farmers requested technical or financial assistance from NRCS for the on-farm efficiency projects, or do they plan to in the future?

Once MSWD has secured the NRCS grant and the District has secured its funds, the farmers will be notified. Meetings will be held in fall 2018 to start the process. Farmers in the first area to be addressed have been contacted in person about the Project and the NCRS process.

If available, provide documentation that the on-farm projects are eligible for NRCS assistance, that such assistance has or will be requested, and the number or percentage of farms that plan to participate in available NRCS programs.

A list of the farmers is provided above. Knowing them and their farms, these folks will likely qualify for the NCRS funding. They have not been officially contacted nor have submitted documentation. That will be gathered as soon as we know the project will move forward.

Applicants should provide letters of intent from farmers/ ranchers in the affected project areas.

The local NRCS office does not have a presence in northern Morrow County, which is where the project is. Folks are not aware of their program and have not used the program. As we convert from flood irrigation, they will learn about it and many will sign up. In discussion between NRCS and ourselves, we decided to secure the funding, then officially start our communication process. We will gather copies of letters of intent as they are signed and have them available.

Describe how the proposed WaterSMART project would complement any ongoing or planned on-farm improvement.

Will the proposed WaterSMART project directly facilitate the on-farm improvement? If so, how? For example, installation of a pressurized pipe through WaterSMART can help support efficient on-farm irrigation practices, such as drip-irrigation.

OR

Will the proposed WaterSMART project complement the on-farm project by maximizing efficiency in the area? If so, how?

The District would replace the open ditches with underground piping and metered pressurized delivery to the farm. This will allow flood ground to convert to more efficient irrigation methods. Flood irrigation will be discontinued on 405 acres in the Project area. By enclosing the delivery system and providing pressurized water, on-farm efficiency improvements will occur on the lands, especially those currently under flood irrigation. These landowners could not complete such improvements without this piping project. Current delivery standards for irrigators wanting to go from flood to sprinkler in the District is to install a pond on their property or make other arrangements to avoid increased tailwater running down the ditch. This project will make a big difference to them.

The Project will install three variable frequency drive pump stations that will serve the 638 acres. Having one pump station to serve each of these three areas will help save energy. The elimination of flood irrigation may have an effect on the groundwater level, which fluctuates and is often high in portions of this Project area. Much of the land receives seepage or sub-surface water. The District is working on a system that will allow landowners to install drainage and the District will pick up the run-off water for use in its system. Lateral 17 is the perfect place to try this as neighboring properties have drained their land; there are specific small drains that have been identified and could be picked up by WEID. This will be part of the Project discussion with the landowners as the Project develops.

Describe the on-farm water conservation or water use efficiency benefits that would result from the enabled on-farm component of this project. Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.

Project - 405 acres converted from flood to sprinkler. Current delivery to those acres is 2633 acre-feet by District delivery records. Future delivery is estimated to be 1418 acre-feet based on 3.5 acre-feet average deliveries in the area. We estimate 1215 acre-feet from on-farm conservation from conversion alone Technical assistance by NRCS and metering each system will help with on-farm management. We do not have a way to calculate that benefit, but it will show up when the pre-project delivery records are compared with the post-project delivery records.

E.1.5. Evaluation Criterion E—Department of the Interior Priorities (10 points)

Up to 10 points may be awarded based on the extent that the proposal demonstrates that the project supports the Department of the Interior priorities. Please address those priorities that are applicable to your project. It is not necessary to address priorities that are not applicable to your project. A project will not necessarily receive more points simply because multiple priorities are addressed. Points will be allocated based on the degree to which the project supports one or more of the priorities listed, and whether the connection to the priority(ies) is well supported in the proposal.

1. *Creating a conservation stewardship legacy second only to Teddy Roosevelt*

a. Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment;
b. Examine land use planning processes and land use designations that govern public use and access;
c. Revise and streamline the environmental and regulatory review process while maintaining environmental standards.
d. Review DOI water storage, transportation, and distribution systems to identify opportunities to resolve conflicts and expand capacity;
e. Foster relationships with conservation organizations advocating for balanced stewardship and use of public lands;

f. Identify and implement initiatives to expand access to DOI lands for hunting and fishing;
g. Shift the balance towards providing greater public access to public lands over restrictions to access.

This Project does not enhance any of the above objectives.

2. *Utilizing our natural resources*
a. Ensure American Energy is available to meet our security and economic needs;
b. Ensure access to mineral resources, especially the critical and rare earth minerals needed for scientific, technological, or military applications;
c. Refocus timber programs to embrace the entire 'healthy forests' lifecycle;
d. Manage competition for grazing resources.

This project does not enhance any of the above objectives.

3. *Restoring trust with local communities*
a. Be a better neighbor with those closest to our resources by improving dialogue and relationships with persons and entities bordering our lands;
b. Expand the lines of communication with Governors, state natural resource offices, Fish and Wildlife offices, water authorities, county commissioners, Tribes, and local communities.

This Water Conservation project spotlights the District's efforts to conserve water and be a better neighbor. As we move from complaining about the lack of return flows and doing something about reducing our water demand, we become more interesting to our regional partners. Dialogue changes to positive. Currently, we have good communication among our partners at State, regional and local levels, but there is always room for improvement.

4. *Striking a regulatory balance*
a. Reduce the administrative and regulatory burden imposed on U.S. industry and the public;
b. Ensure that Endangered Species Act decisions are based on strong science and thorough analysis.

This is not an expected outcome of the Project.

5. *Modernizing our infrastructure*
a. Support the White House Public/Private Partnership Initiative to modernize U.S. infrastructure;
b. Remove impediments to infrastructure development and facilitate private sector efforts to construct infrastructure projects serving American needs;
c. Prioritize DOI infrastructure needs to highlight:
- **一. Construction of infrastructure;**
- **一. Cyclical maintenance;**
- **一. Deferred maintenance.**

This project will replace aging infrastructure (concrete-line sub laterals) with PVC and HDPE pipe. Efficient variable frequency drive pump stations will be installed. Water deliveries will be metered. As the open laterals are piped, it will pave the way for the District to eventually address its main canal and look at ways to modernize its delivery structure.

E.1.6. Evaluation Criterion F—Implementation and Results (6 points)

*Up to **6 points** may be awarded for these subcriteria.*

E.1.6.1. Subcriterion F.1— Project Planning

Points may be awarded for proposals with planning efforts that provide support for the proposed project.

Does the applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place? Please self-certify, or provide copies of these plans where appropriate to verify that such a plan is in place.

Yes, the District has a Water Management and Conservation Plan (WMCP) in place. Many of the discussion in this document was provided by that plan.

Provide the following information regarding project planning:

(1) Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Drought Contingency Plan or other planning efforts done to determine the priority of this project in relation to other potential projects.

The District has its Water Management and Conservation Plan (WMCP). This plan contains a System Optimization Review and a Drought Contingency Plan. This plan was completed in 2012, reviewed by the Bureau of Reclamation in 2013 and approved by the State of Oregon in 2013. Reference to it has been included throughout this application.

The WMCP was funded with a matching federal grant under the USBR's Water 2025 System Optimization Review Program. The final section summarizes key information contained in the WMCP and satisfies the requirements of a USBR WaterSMART System Optimization Review. The WMCP contains four specific sections:

Water Supplier Description

Water Conservation Element

Water Curtailment Element

Water Supply Element

Copies of the complete WMCP are available upon request.

A summary of the System Optimization Review is included as Attachment B.

The District developed its Boardman Master Plan (BMP) in 2004 when it went through a public process. The BMP discusses each of the Boardman laterals, identifies landowners, acreage and methods of irrigation. A map for each service area is included with plans for converting each lateral to a piped system. The BMP was updated in 2015 and updates continue as the planning for piping takes place. It is a valuable guiding document for the District Piping and Pressurization Water Conservation Project.

(2) Describe how the project conforms to and meets the goals of any applicable planning efforts, and identify any aspect of the project that implements a feature of an existing water plan(s).

The Project meets the goals established and adopted by the District in it WMCP. Laterals 15 and 17 set as a high priority laterals for piping and water conservation. Timeline in the plan was 2015-2017, so we are a little behind that schedule. This Project will get us back on schedule.

Part of the WCMP is addressing the water shortfalls of the District. Key to that is eliminating flood irrigation and piping the open laterals in the District. Operationally, this work will save time in labor and equipment for the District. The water conservation component is critical to the ability of the District to meets its goals of providing efficient and reliable water to its patrons.

E.1.6.2. Subcriterion F.2— Performance Measures

Points may be awarded based on the description and development of performance measures to quantify actual project benefits upon completion of the project.

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved or better managed, energy generated or saved).

See performance measures section below.

E.1.7. Evaluation Criterion G— Nexus to Reclamation Project Activities (4 Points)

*Up to **4 points** may be awarded if the proposed project is in a basin with connections to Reclamation project activities. No points will be awarded for proposals without connection to a Reclamation project or Reclamation activity.*

Is the proposed project connected to Reclamation project activities? If so, how? Please consider the following:

Does the applicant receive Reclamation project water? The project receives both privately developed water and Reclamation water. All water is for irrigation.

Is the project on Reclamation project lands or involving Reclamation facilities? Yes.
The West Extension Irrigation District is a federally owned project.

Is the project in the same basin as a Reclamation project or activity? Yes.

Will the proposed work contribute water to a basin where a Reclamation project is located? Yes**.**

Will the project benefit any tribe(s)? Yes, water left instream will benefit the needs of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and benefit the 1988 Umatilla Basin Act for fisheries.

E.1.8. Evaluation Criterion H— Additional Non-Federal Funding (4 points)

*Up to **4 points** may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided using the following calculation:*

$$\frac{648{,}665}{1{,}178{,}665}$$

Non- federal funding is 55%.

PROJECT SCHEDULE

YEAR ONE

Task	Jan-June 2019	July - Sept 2019	Oct - Dec 2019
Meet with Landowners for all project	XXXX		
Meet onsite landowners Lat 12/ NCRS mtgs	XXXX		
Complete engineering & Design – Lat 12	XXXX		
Complete land survey Secure crossing permits	XXXX		
Order pipe & materials – Lat 12 Receive mtrls		XXXX	
Secure contractors		XXXX	
Site Preparation		XXXX	XXXX
Do canal work			XXXX
Install pipe – Lat 12 Pump Stations			XXXX
Install deliveries – Lateral 12			XXXX
Cleanup – Lateral 12			XXXX

.

YEAR TWO

Task	Jan – June 2020	July - Sept 2020	Oct - Nov 2020
Landowner on site/NCRS meetings	XXXX		
Complete engineering & Land survey	XXXX		
Secure road crossing permits	XXXX		
Order pipe & materials – Lat 15, receive mtrls		XXXX	
Secure contractors		XXXX	
Site Preparation		XXXX	XXXX
Do canal work			XXXX
Install pipe – Lat 17		XXXX	XXXX
Build/install pump station			XXXX

Install deliveries – Lateral 17			XXXX
Cleanup – Lateral 17			XXXX

YEAR THREE

Task	Jan – June 2021	July – Sept 2021	Oct – Dec 2021
Landowner on site & NCRS meetings	XXXX		
Complete engineering & land survey – Lat 17	XXXX		
Secure road crossing permits	XXXX		
Order pipe and materials – Lat 17	XXXX		
Receive materials		XXXX	
Site Preparation		XXXX	
Do canal work			XXXX
Install pipe – Lat 17 Install pump station			XXXX
Install deliveries – Lateral 17			XXXX
Cleanup – Lateral 17			XXXX
Prepare final Project reports			May – June 2019

Please explain any permits that will be required, along with the process for obtaining such permits. Identify and describe any engineering or design work performed specifically in support of the proposed project.

There are 7 crossings in this project. A federal crossing exist at each point. Permits will be required from Morrow County for work along their road. There is no cost for the permit from Morrow County, but there will be a small engineering fee to prepare a drawing for the two crossings.

JUB Engineers of Kennewick, Washington, is the District's engineer. Greg Moore is the lead design engineer on this project. Preliminary maps have been prepared as part of this grant application. The District will need construction maps showing detailed location of crossings, hookups, and pipe changes (elbows, reducers). Plans and sizing for the pump stations will also be done by the engineer. There may be one or two specific detail maps needed for each phase of the Project.. Since the District is using its own crew to lead the work, we will not require a full set of engineered drawings for this Project.

PERFORMANCES MEASURES

Narrative for Quantifiable Water Savings

Water will be conserved from eliminating or replacing five open ditches that have operational losses and spills, working with NCRS for landowner on-farm projects and metering all deliveries.

Pre-Project estimations of baseline data: The District has SCADA and daily water measurements which show the amount of water being delivered down the laterals. Laterals 12,13 and 18 are flood lateral and water delivery records can be used to quantify the water delivered down that lateral. Laterals 15 and 17 each have a data logger at the headworks, so water is measured at that point.

Post-Project methods for accumulating data and quantifying savings; A meter will be installed at each pump station and at each delivery. The historic records can be compared to the records after the completion of the project and used to quantify the water savings.

Narrative for Energy Efficiency in Water Management.

Since much of the land is currently flood irrigated, there will be no energy savings from those lands. The project will eliminate 14 farmer pumps by providing pressurized water down each new pipeline.

It will be difficult to quantify any electric savings.

Narrative for Operational Efficiency.

There will be operational savings, identified in the chart below.

Activity	Comment	Time	Cost / Day	Annual Savings	
Winter cleaning	Inmate crew	12 days	$540	$ 6480	District
Winter cleaning	WEID crew	12 days	$200	$ 2400	District
Spring weed clearing	WEID crew	20 hrs	$ 30	$ 600	
Mowing/Spraying	WEID crew/equip	8 days	$250	$ 2000	District
Monitoring water	WEID crew	3.5 hr/weekly	$30	$ 3150	District
Managing water	Landowners	16/hrs week	$20	$ 8320	Landowners
		TOTAL ANNUAL SAVINGS		$22,950	

ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

Enviro 1: Will the project impact the surrounding environment?

Very little. This is a construction project. The old concrete laterals will be removed and replaced with pipe. Portions of the original lateral will be abandoned. This concrete will be removed and area will be filled in. This is a developed area. Soil is sandy loam. Impact to the environment will be small, if any.

Enviro 2: Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area?

No.

Enviro 3: Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "waters of the United States?"

No.

Enviro 4: When was the water delivery system constructed?

1916

Enviro 5: Will the project result in any modifications of or effects to, individual features of an irrigation system? If so, state when these features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.

Yes. The project will remove the existing concrete-lined canals. Headgates 12, 15 and 17 will be modified and screening added. Headgate 13 and 18 will be eliminated. Construction was in 1916. There have been no extensive alterations or modifications to the original construction.

Enviro 6: Are any buildings, structures or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?

None are listed. We are in the process of doing our Environmental and Cultural Resources Inventory. We will send the documents to Reclamation in 2018 for a complete review. This work should be completed in 2018 and is not part of the cost of this Project.

Enviro 7: Are there any known archeological sites in the proposed project area?

No.

Enviro 8: Will the project have a disproportionately high and adverse effect on low income or minority populations?

No.

Enviro 9: Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

No.

Enviro 10: Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

No.

PERMITS / APPROVALS

Morrow County Permit: A permit will be needed from Morrow County for the road crossings. There is no charge for this permit.

Land Use Permits: No land use permits are anticipated.

Road Crossings: Other road crossings (nine) are part of the existing project, which has federal easements acquired under the Reclamation Act of 1892.

Existing Easements: The federal-owned project has easements acquired in the Reclamation Act of 1892 and by a court decree in 1914.

Relocated Easements: Portions of the existing lateral may be abandoned and easements relocated. These will be reviewed by Reclamation prior to project implementation.

OFFICIAL RESOLUTION

TO BE SENT IN – AFTER MAY 17, 2018

PROJECT BUDGET

Funding Plan

The non-federal share of the project will be from the WEID. Specifically, they will be drawn from District Reserve Funds for conservation projects, from its annual O&M charge to its patrons and from a meter fee to each landowner served in the project area. The District may arrange for funding through the DEQ Water Quality Revolving Loan Fund. That option will be considered in 2018. There will be no delays on the funding plan.

The funds will be available – For Year One, 100% January 1, 2019. Year Two, 100% January 1, 2020. For Year Three, 100% January 1, 2021. The District has reserve funds to assist with any delay in its funding.

There are not time constraints to any of the funds as these are secured by the District.

There are no contingencies associated with the funds.

1.	**Describe how the Applicant will make its contribution to the cost share requirement, including a description of monetary and in-kind contributions, and identification of the source funds contributed by the applicant.** The applicant will provide administrative, managerial, field support and equipment for the project. The Board of Directors will be actively involved with reviewing project data and establishing priorities and goals for the finished product. Monetary costs will include upgrading maps, transportation, and preparing reports. Funds will be taken from the current annual O&M Budget with $150,000 available from Project Reserve Funding.
2.	**Describe any in-kind costs incurred before the anticipated project start date that you seek to include in the project.** None.
3.	**Provide the identity and amount of funding to be provided by funding partners, as well as letters of commitment.** Possibly from Oregon DEQ Water Quality Revolving Loan Fund.
4.	**Describe any funding requested or received from other Federal partners.** None.

5.	**Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.** None.

Budget Table 1 - Summary of Non-Federal & Federal Funding Sources

FUNDING SOURCE	FUNDING AMOUNT
Non-Federal Entities:	
West Extension Irrigation District	
WEID In - Kind	289,441
Budget, Line Item	179,000
Reserved Funds/Credit	180,000
Non-Federal Subtotal	648,665
Reclamation Funding	530,000
TOTAL PROJECT FUNDING	1,178,665

Budget Table 2 – Funding Group II funding request

	Year 1 (FY 2018-19)	**Year 2 (FY 2019-20)**	**Year 3 (FY 2020-21)**
	$100,000	**$215,000**	**$215,000**

Budget Proposal

Budget Table 3 – Funding Sources

Funding Sources	Percent of Total Project Budget	Total Cost By Source
WEID Funding	**$ 648,665**	**55%**
Reclamation Funding	**$ 530,000**	**45%**
TOTALS	**$1,178,665**	

Budget Table 4 – Budget Proposal

DETAILED PROJECT BUDGET – BOARDMAN LATERALS PHASES III, IV, & V.

Budget Item Description	Quantity	Price/Unit	Cost
Salary/Wages			
Manager	400 hrs	$34.94/hr	$ 13,976
Supervisor	800 hrs	$22.00/hr	$ 17,600
District Crew	3580 hrs	$20.00/hr	$ 71,600
Temp Labor	1700 hrs	$17.00/hr	$ 28,900
Bookkeeper	100 hrs	$21.00/hr	$ 2,100
Sub-total Labor			$134,176
Fringe - Mgr		47.36%	$ 6,619
Fringe - Supervisor		50.56%	$ 8,899
Fringe - District Crew		51.77%	$ 37,067
Fringe – Crew/labor		10.87%	$ 3,140
Fringe - Bookkeeper		55.81%	$ 1,172
Sub-total Fringe			$ 56,897
Equipment			
Trackhoe/Loader	828 hrs	$44.55	$ 36,877
Backhoe/Loader	840 hrs	$22.23	$ 18,673
Dump Truck	1020 hrs	$34.48	$ 35,170
1 ton 4X4 pickup	188 hrs	$21.39	$ 4,021
¾ ton 4X4 crew	98 hrs	$22.74	$ 2,228
½ ton 2X4 pickup X 2	66 hrs	$21.20	$ 1,399
Sub-total equipment			$ 98,368
Supplies/Materials			
15-inch PIP 125 psi	8400 feet	14.40	$120,960
12-inch IPS 125 psi	3300 feet	10.68	$ 35,244
10-inch IPS 125 psi	1000 feet	9.65	$ 9,650

8-inch IPS 125 psi	400feet	3.60	$ 1,440
6-inch IPS 125 psi	6900 feet	2.80	$ 19,320
4-inch IPS 125 psi	2800 feet	1.95	$ 5,460
14” AWWA valve	6 each	12,000	$ 72,000
12” AWWA valve	1 each	5,800	$ 5,800
10” AWWA valve	3 each	3.200	$ 9,600
8” AWWA valve	10 each	2,000	$ 20,000
Valves, tees, reducers, elbows, wire	Lot	19,500	$ 19,500
Flush valves, air vac	Lot	3,500	$ 3,500
Delivery valves	56 each	300	$ 16,800
Delivery meter assembly	56 each	950	$ 53,200
Canal work at headgate			$ 5,100
Headgate screen (3)			$ 13,500
System meter @ pump (3)			$ 6.650
VFD Pumps & Stations	3 each		$ 64,000
Power to site	3 each		$ 38,000
Pump station materials, fitting, joints	3 each		$ 64,000
Permits			$ 1,500
Fill & Gravel			$ 40,000
Building & Pad			$ 25,500
Gravel			$ 16,000
Sub-total materials			$666,724
Contractors			
Construction prep, tree & concrete removal			$ 55,000
Road crossing, HDPE	7 each		$ 41,000
Engineering			$ 61,000
Surveying			$ 25,500
Electrician			$ 40,000
Environmental			$ 0
TOTAL CONTRACTOR			$222,500
TOTAL PROJECT			1,178,665

Budget Narrative

Salaries and Wages – Discuss type of personnel needed for the project, their qualifications, and the rationale for the number of hours proposed for various personnel.

Bev Bridgewater, District Manager – Annual salary $72,675. Rate of $34.94 per hour for the project. 400 hours for planning, landowner meetings, easements, ordering materials, managing and general oversight of project.

Ben de los Santos, Field Supervisor – Pay rate of $22.00 per hour. 800 hours for planning, receiving materials, crew oversight and supervising all phases of project.

Lisa Baum, Office Manager – Hourly rate of $21.00. Will do bookwork, manage payroll and safety supplies, handle customer inquiries and notifications. 100 project hours.

Crew – Hourly rate of $20.00. Will construct project, operate some equipment, do landowner hookups, build & install pump station, install meters, do clean-up work. Total of 3580 hours.

Labor – Hourly rate of 17.00. Will hire one to two temps assist crew with installation, services & Clean-up. 1700 hours.

Fringe Benefits – The District has paid leave, health insurance, PERS, and the standard state and federal payroll tax benefits. The rate for each employee class has been calculated and is provided below

Bev Bridgewater, Manager	47.36%
Lisa Baum, Bookkeeper	55.81%
Ben de los Santos, Supervisor	50.56%
Field Crew	51.77%
Labor, temp	10.87%

Travel – No travel will be billed for this job.

Equipment – All equipment is owned by the District. Equipment used on the project and rate (using Army Corps Region 8 Ownership and Operating Costs) 2016 pamphlet.

Trackhoe/Loader	$45.32/hr less depr & age adj	=	Billing rate of $44.55 per hour
Backhoe/Loader	$23.32/hr less depr & age adj	=	Billing rate of $22.23 per hour
Dump Tr/Box	$35.62/hr less depr & age adj	=	Billing rate of $34.48 per hour

Pick-ups for part and supplies

1 ton 4X4	$21.71/hr less depr & age adj	=	Billing rate of $21.39 per hour
¾ ton 4X4	$22.46/hr less depr plus age adj	=	Billing rate of $22.74 per hour
½ ton 2X4	$20.13/hr less depr plus age adj	=	Billing rate of $21.20 per hour

Materials and Supplies – Supplies and materials will be billed at cost. We have quotes for today's cost of these materials and have added 2% to estimate future costs.

Sub-Contractor: A contractor will be hired for removing trees and old concrete. Based on current bid for similar work, we have estimated the cost to be $55.000.

Road crossings. There are seven road crossings. HDPE will be used for these crossings and HD Fowler will do the work. Using recent work they have done for us and adding a 2% for pipe increase, the cost is anticpated to be $41,000.

Engineering: The district will use its engineering firm for the pipe and pump station design. There will be some field work. J-U-B Engineers in Kennewick, WA. They have been selected in a competitive bid basis to represent the District. Preliminary work on the project is complete.
Per their quote - $61,000

Surveyor: A surveyor will be hired to locate the actual right-of-way relative to the private land and to file any easements with the county. We will not get a bid until the work is settled, but previous experience shows $25,500 for this work.

Electrician: Each of the three phases of the project will have a pump station. The utiliy company will bring three-phase power to each site. That cost is included in materials. An electrician will install the panel and do all electrical work for the pump station. Each station will have one 40-50 HP pump with variable frequency drive and a smaller pipe tied into the system.

Environmental and Regulatory Compliance Costs – This work will be completed in 2018, so is not a part of the project.

Indirect Costs: No indirect costs will be billed on this Project.

WEID System Map

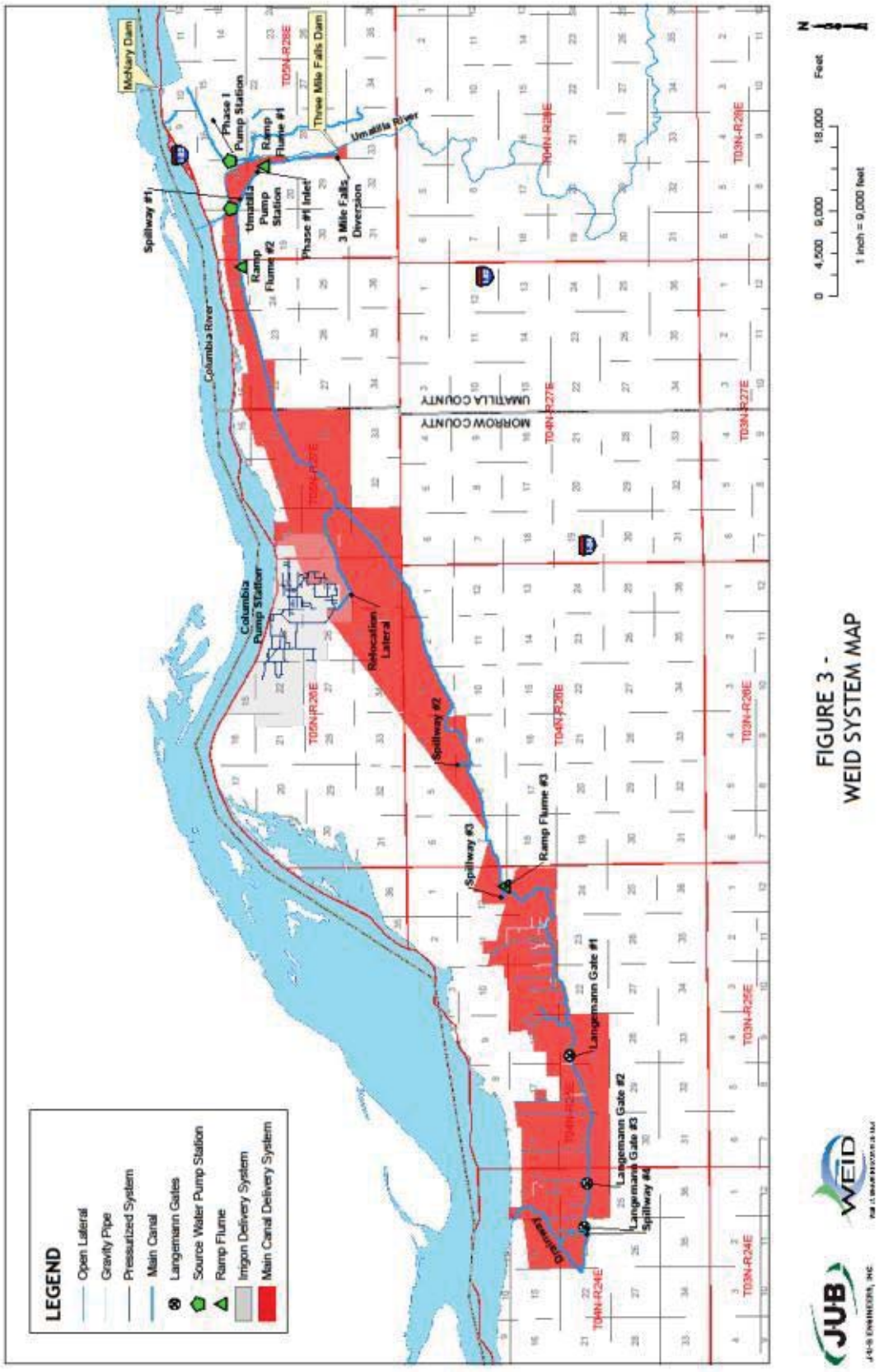


FIGURE 3 - WEID SYSTEM MAP

Attachment “A”

NRCS letter

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

430 Linden Way
P.O. Box 127
Heppner, Or 97836
Phone: (541) 676-5021 ext 107

May 9, 2018

To whom it may concern:

It would be NRCS's intent to support the West Extension Irrigation Districts piping of laterals 12, 15 and 17. We have submitted a complimentary conservation implementation strategy that is in the review process. If approved, we anticipate that our support would entail financial and technical assistance to landowners on those laterals that are converting from flood to sprinkler irrigation. The project aligns with our priority resource concerns identified in the NRCS Morrow County long range plan.

Jennifer Wilson
Acting District Conservationist

Attachment “B”

System Optimization Review

SECTION 6.0 - SYSTEM OPTIMIZATION REVIEW

This review is an analysis of the system-wide efficiency of the WEID with a focus on improving the effectiveness and operations of the delivery system. Much of the information in the review is a summary of the detailed information in the previous sections of this Water Management and Conservation Plan.

Gathering the information necessary for this review was a combined effort between WEID and J-U-B Engineers. Historical records on flows, diversions, pumping, land use, irrigation methods, crop type, crop evapotranspiration, and seepage rates were gathered. Another component of data that has helped the WEID is the GIS data that has been added and collected as part of the 3111 water rights mapping project.

6.1 ISSUES AND PRIORITIES

As explained in Section 1.9.5, the main irrigation maintenance problems are leaking canals and laterals, plugged pipes, leaking or broken headgates or valves, broken pipes, and pump difficulties. The WEID Main Canal, is approximately 27 miles long, and represents a large proportion of the District's system. The Main Canal is aged (built in 1914 – 1916) and its concrete panels are in poor to fair condition. Laterals off the Main Canal vary greatly in estimated seepage loss rates. In 2004, the District and J-U-B Engineers developed the Boardman Master Plan which devises a plan for converting the open ditch laterals to buried pipes.

Historically, the District has had a difficult time getting enough water to its customers during the peak summer months. This is caused by water shortages in the Umatilla River, and not by deficient water right volumes (see Section 2.5.2). Insufficient flows in the Umatilla River decrease the allowable volume that WEID can divert into its Main Canal. The decreased flow in the Umatilla River is thought to be caused by significant reductions in return flows from upstream irrigated lands. So although the WEID has sufficient water rights, the availability of water is pressing the need for the District to optimize their system. The focus of the District has been on conservation efforts. WEID has emphasized conversion from flood to sprinkler systems as well as canal re-lining and lateral piping in order to decrease the water demands.

6.2 GOALS

WEID has established a set of priorities and objectives with a focus on water conservation and management within the District. These are listed in Section 2.4. Some of the main conservation objectives are:

- Plan, develop and implement appropriate conservation measures;
- Monitor and support quality of water;
- Provide training and resources to employees;
- Provide and promote public education and outreach;
- Support creative regional approaches to water needs and supply;
- Work with regional partners to develop plan and policies.

The main facility management objectives are:

- Assess and maintain all District facilities;
- Repair and replace the aging Main Canal infrastructure;
- Develop a plan to repair and replace Boardman open laterals with pipelines;
- Replace aging steel pipelines on the Irrigon Pressurized system;
- Address screening concerns at the Umatilla and Irrigon Pumping Stations;
- Assure pumping station are regularly maintained;
- Maintain District roadways and right-of-ways;
- Continue preventative maintenance, repair and replacement activities;
- Meet current and anticipated regulatory requirements;
- Obtain proper equipment to maintain facilities.

Many of the goals for the WEID are on-going programs, such as the canal panel replacements. The District has a long-term goal of converting the open ditch laterals to piped, closed systems and shifting flood deliveries to sprinkler deliveries. Other priority projects have specific dates the District would like to accomplish their goal.

6.3 POTENTIAL IMPROVEMENTS

Figure 5 shows conservation projects that are planned in the District. Many of the projects involve converting acreage that is currently served by flood irrigation to sprinkler irrigation. Table 31 lists the conservation projects, along with estimated water savings, costs, and year to be completed.

6.4 PLAN OF ACTION

Each of the specific improvements the WEID has targeted in Table 31 has a priority and a year to accomplish it. Other projects are dependent on private development or funding availability. The District has established standards and policies to guide the completion of future projects. Some of these standards include:

- The Boardman Master Plan showing open ditch lateral conversion to piped laterals;
- Pumping Station standards including the installation of variable frequency drives;
- Plans for additional control gates at the Relocation Canal and at the Three Mile Dam diversion;
- Partition and sub-division standards.

The District has recognized that one of the most cost effective ways it can decrease irrigation demand is through conservation efforts. The District has an active public education program (Section 2.8), and will continue to look for additional ways to increase the efficiency of on-farm scheduling as well as operation of the District. Several conservation projects have been completed (see Table 30) and several more are planned (see Table 31). The focus is to convert flood to sprinkler deliveries as well as repair canal linings and pipe laterals.

Attachment “C”

Maps

WEID System Map

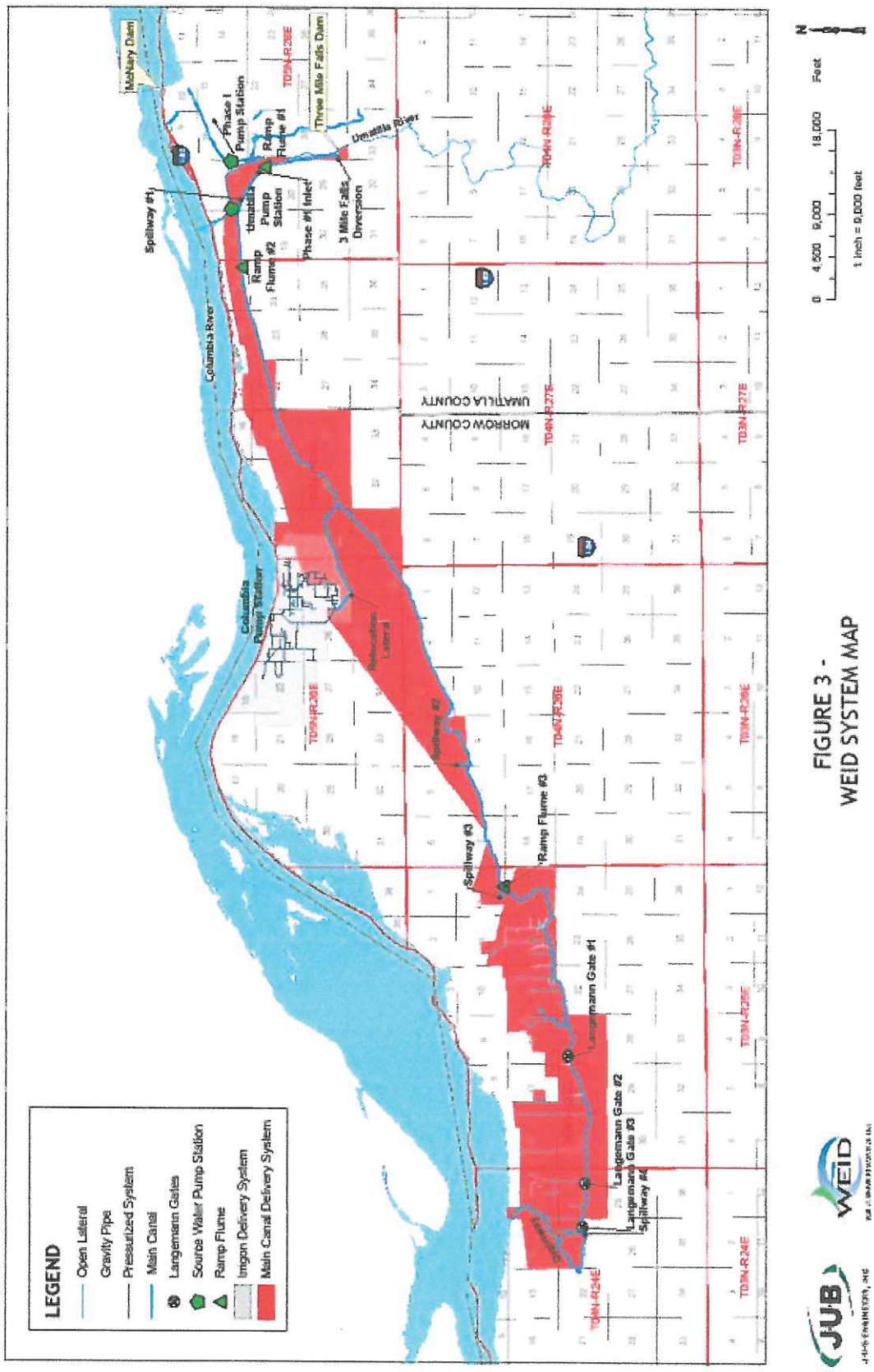
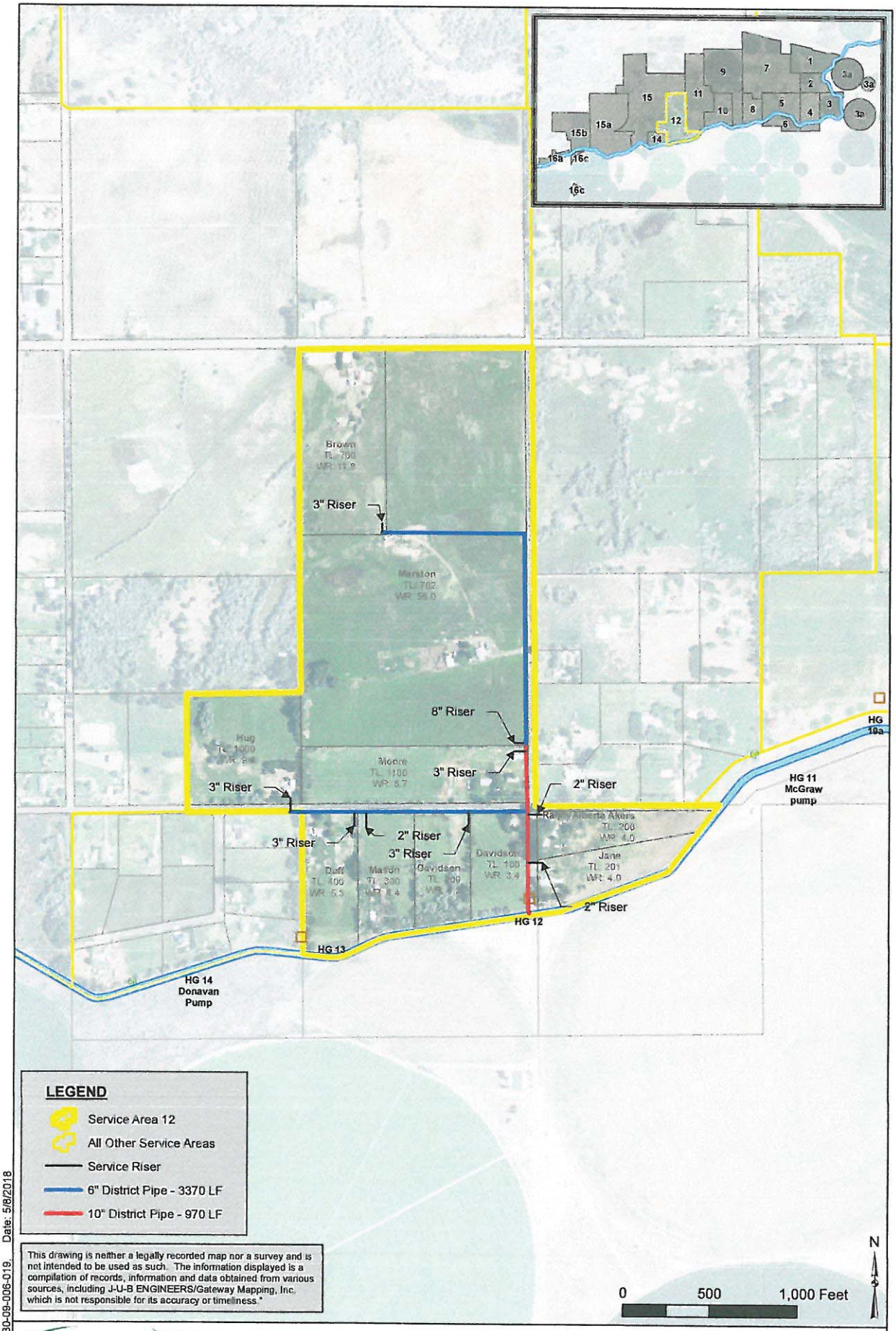


FIGURE 3 -
WEID SYSTEM MAP



Project #: 30-09-006-019 Date: 5/8/2018

J-U-B ENGINEERS, INC.

WEST EXTENSION IRRIGATION DISTRICT

WEST EXTENSION IRRIGATION DISTRICT
Service Area 12 - 123.2 Acres - 111.2 WR Acres

SHEET 1 OF 1

Service Area 12

Existing Conditions

Service Area 12 irrigates 90.0 acres throughout Sections 15 and 22 of Township 4N, Range 25 E with a mix of flood and sprinkler irrigation, as shown in Table 12.

Table 12—Service Area 12

Delivery	Acres	Map/Tax Lot#	W/R Year	Last Name
MC-B-12HG-F	11.80	4N2515 0700	1909	Brown
MC-B-12HG-F	56.00	4N2515 0702	1909	Marston
MC-B-12HG-S	8.70	4N2515 1100	1909	Moore
MC-B-13HG-F	9.40	4N2515 1000	1909	Hug
MC-B-12HG-F	3.40	4N2522BA0100	1909	Madrigal
MC-B-12HG-F	4.20	4N2522BA0200	1909	Madrigal
MC-B-12HG-F	4.40	4N2522BA0300	1909	Mason
MC-B-12HG-F	5.30	4N2522BA0400	1909	Duff
MC-B-12HG-S	4.00	4N2522AB0200	1909	Akers, Ralph/Alberta
MC-B-12HG-S	4.00	4N2522AB0201	1909	Akers
Total Flood	*94.5*			
Total Sprinkle	*16.7*			
Total	**111.2**			

Recommended Improvements

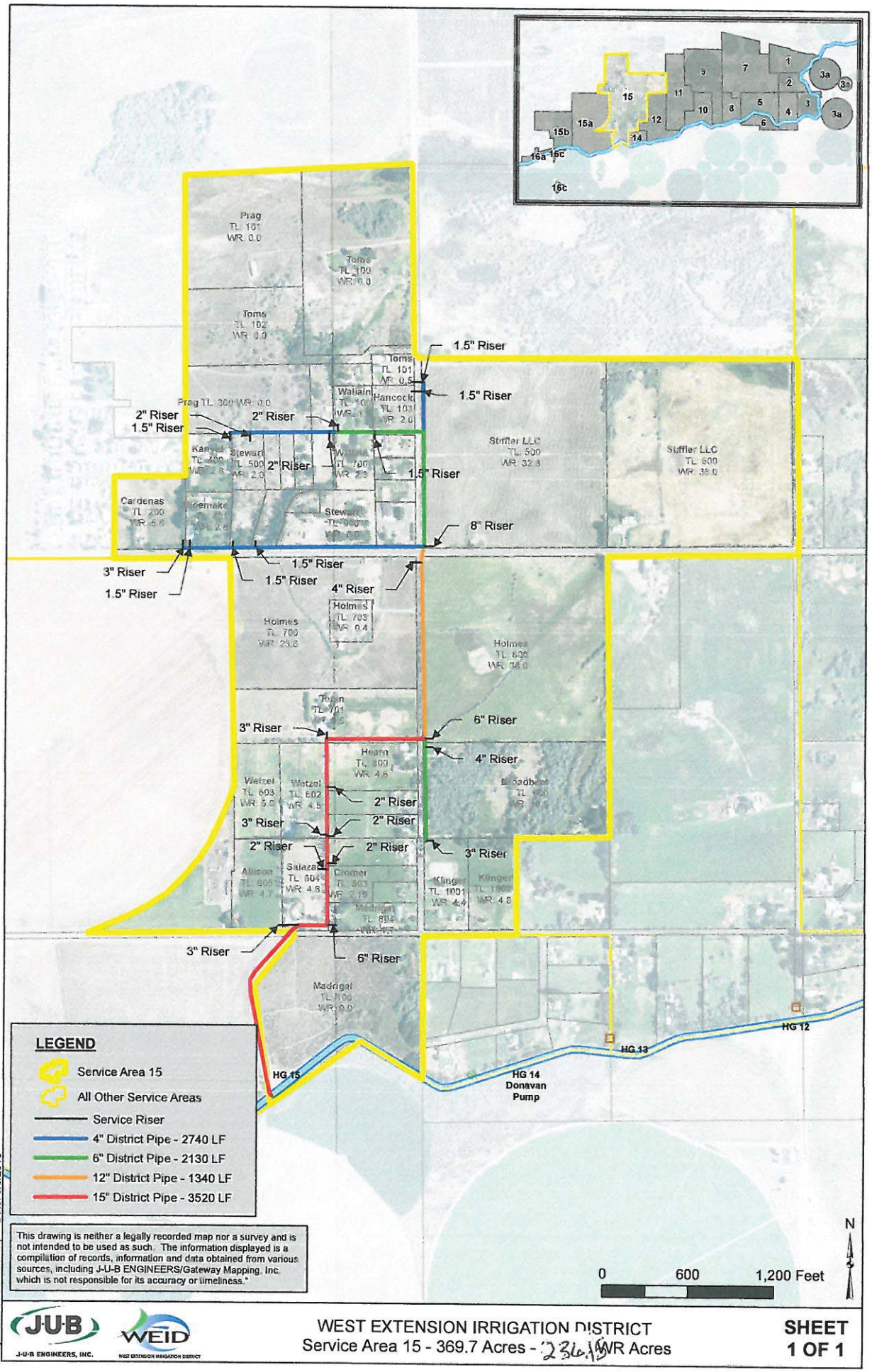
Recommended improvements include replacing the open lateral with a gravity pipe. Based on current zoning, development of the land in Service Area 12 is not anticipated. The pipe sizing should be based upon 8.5 gpm/acre required for sprinkler irrigation. Preliminary pipe sizing and routing are shown in Service Area 12 map.

Priority

The upgrade of Lateral 12 is seen as medium priority. Converting the area to a sprinkler system will convert 94.5 acres of flood ground to sprinkler. That alone will save 283.5 water right acres. Additional savings will be from delivery loss and seepage.

Bev's Notes

Combine 12 and 13 with pressurized delivery - Variable frequency drive pump - metered.
Work with irrigators to convert 94.5 acres from flood to sprinkler.


1.5" Riser
1.5" Riser
2" Riser
2" Riser
1.5" Riser
2" Riser
1.5" Riser
8" Riser
3" Riser
1.5" Riser
1.5" Riser
4" Riser
3" Riser
6" Riser
4" Riser
2" Riser
3" Riser
2" Riser
2" Riser
2" Riser
3" Riser
3" Riser
6" Riser
HG 15
HG 14
Donavan
Pump
HG 13
HG 12
LEGEND
Service Area 15
All Other Service Areas
Service Riser
4" District Pipe - 2740 LF
6" District Pipe - 2130 LF
12" District Pipe - 1340 LF
15" District Pipe - 3520 LF
This drawing is neither a legally recorded map nor a survey and is not intended to be used as such. The information displayed is a compilation of records, information and data obtained from various sources, including J-U-B ENGINEERS/Gateway Mapping, Inc. which is not responsible for its accuracy or timeliness."
N
0
600
1,200 Feet
Project #: 30-09-006-019 Date: 5/8/2018
J-U-B ENGINEERS, INC.
WEST EXTENSION IRRIGATION DISTRICT
Service Area 15 - 369.7 Acres - 236.15 WR Acres
SHEET
1 OF 1

Service Area 15

Existing Conditions

Service Area 15 irrigates 232.35 acres throughout Sections 15, 16, and 21 in Township 4 N, Range 25 E. Service Area 15 is irrigated with a mixture of flood and sprinkler irrigation, as shown in Table 15. Service Area 15 is a combination of open District laterals, District pipes, and private open laterals.

Table 15—Service Area 15

Delivery	Acres	Map/Tax Lot#	W/R Year	Last Name
MC-B-15aP-S	5.4	4N2516 0428	1893	Allison
MC-B-15HG-S	32.8	4N2515 0500	1893	Stiffler LLC
MC-B-15HG-F	5.6	4N2516 0200	1893	Cardenas
MC-B-15HG-F	4.6	4N2516 0800	1893	Hearn
MC-B-15HG-F	1.7	4N2516 0801	1893	Sanchez
MC-B-15HG-F	2.7	4N2516 0802	1893	Cromer
MC-B-15HG-F	0.7	4N2516 0803	1893	Madrigal
MC-B-15HG-F	1.7	4N2516 0804	1893	Madrigal
MC-B-15HG-F	1.7	4N2516 0805	1894	Sanchez
MC-B-15HG-F	2.15	4N2516 0806	1895	Cromer
MC-B-15HG-F	1.4	4N2516AD0200	1893	Prag
MC-B-15HG-F	2.8	4N2516AD0400	1893	Kanyid
MC-B-15HG-F	2.8	4N2516AD0401	1893	Shoemake
MC-B-15HG-F	2.0	4N2516AD0500	1893	Martinez
MC-B-15HG-F	1.0	4N2516AD0501	1893	Prag
MC-B-15HG-F	0.2	4N2516AD0502	1893	Prag
MC-B-15HG-F	1.0	4N2516AD0503	1893	Martinez
MC-B-15HG-F	1.7	4N2516AD0504	1893	Mayfield
MC-B-15HG-F	1.4	4N2516AD0600	1893	Prindle
MC-B-15HG-F	2.3	4N2516AD0700	1893/1968	Wallain
MC-B-15HG-F	1.2	4N2516AD0701	1893	Prag
MC-B-15HG-F	38.0	4N2515 0800	1909	Holmes
MC-B-15HG-F	19.5	4N2515 0900	1909	Broadbent
MC-B-15HG-S	4.4	4N2515 1001	1909	Klinger
MC-B-15HG-S	4.8	4N2515 1002	1909	Klinger
MC-B-15HG-S	4.5	4N2516 0602	1968	Wetzel
MC-B-15HG-S	5.0	4N2516 0603	1968	Wetzel
MC-B-15HG-S	4.6	4N2516 0604	1968	Griggs
MC-B-15HG-S	4.7	4N2516 0605	1893	Allison
MC-B-15HG-S	23.6	4N2516 0700	1968	Holmes
MC-B-15HG-S	9.5	4N2516 0701	1968	Tobin
MC-B-15HG-S	0.4	4N2516 0703	1968	Holmes
MC-B-15HG-S	1.8	4N2516AD0100	1968	Wallain
MC-B-15HG-S	0.5	4N2516AD0101	1968	Toms
MC-B-15HG-S	2.0	4N2516AD0103	1968	Hancock
MC-B-12HG-S	36.0	4N2515 0600	1893	Stiffler LLC
Total Flood	*96.15*			
Total Sprinkle	*140.00*			
Total	**236.15**			

Recommended Improvements

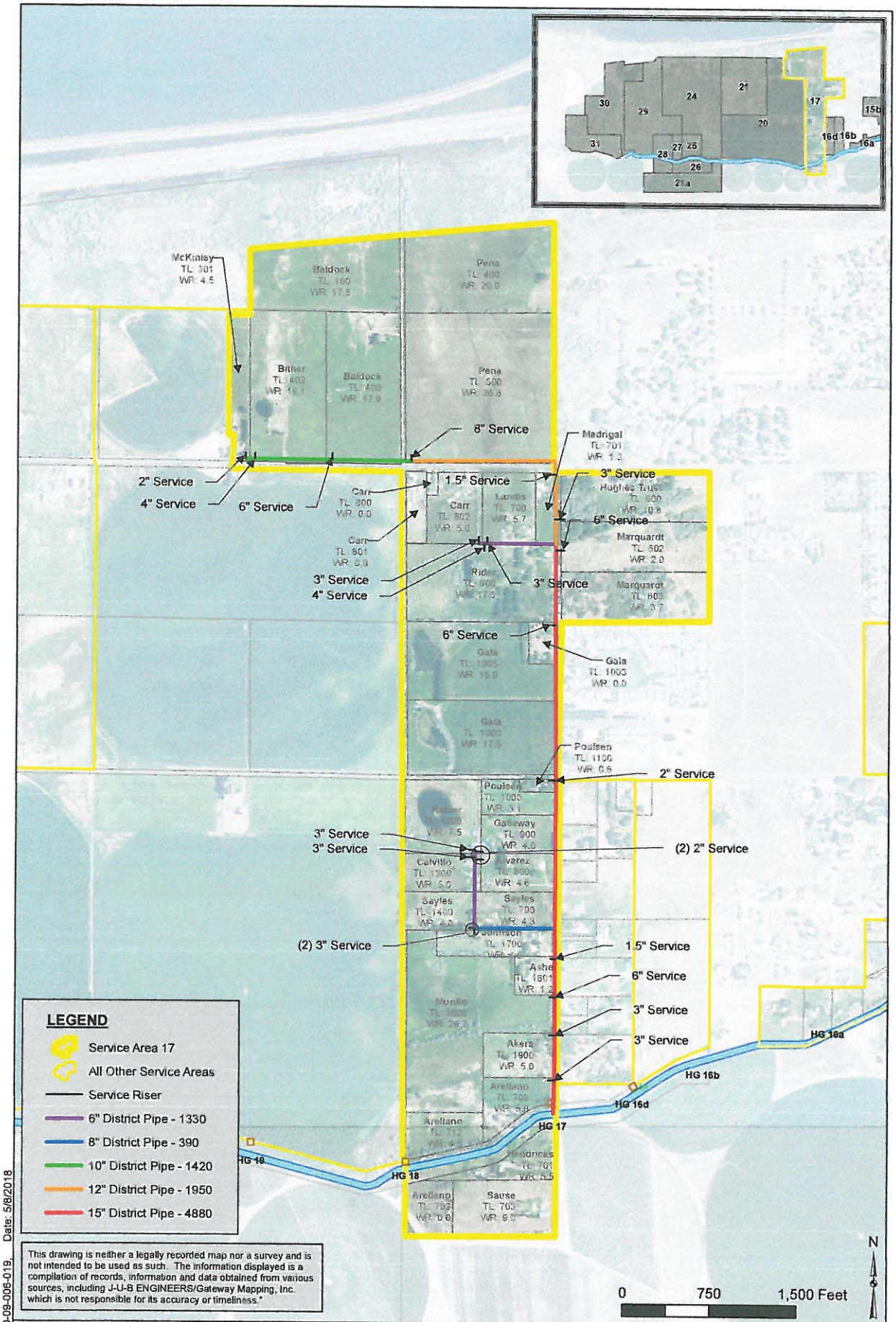
Recommended improvements for Service Area 15 include replacing all District laterals with pipes. In addition, all private open ditches should be removed. Although there are both flood irrigators and sprinkler irrigators in Service Area 15, the pipe should be sized for 8.5 gpm/acre for sprinkler irrigation. A schematic of the proposed pipe routing and sizing is shown in the map for Service Area 15.

Priority

The upgrade of Lateral 15 is seen as a high priority due to water savings. The ditch has seepage and delivery losses. Additionally, 96.15 acres will be converted from flood to sprinkler, saving 289 acre-feet of water annually. Installing a single pump station with VFD will provide energy savings as 8 individual existing pumps will be removed from service.

Bev's Notes

Convert entire system to Sprinkler
Pressurize delivery with variable frequency drive and meters.



Project #: 30-09-006-019 Date: 5/8/2018

J-U-B ENGINEERS, INC.

WEST EXTENSION IRRIGATION DISTRICT

WEST EXTENSION IRRIGATION DISTRICT

Service Area 17 - 365.6 Acres - 290.2 WR Acres

SHEET 1 OF 1

Service Area 17

Existing Conditions

Service Area 17 irrigates 324.2 acres throughout Sections 17, 18, and 20 Township 4N, Range 25E with a mixture of flood and sprinkler irrigation as shown in Table 17. Service Area 17 is a combination of private pumps which irrigate the properties to the south of the canal and an open District lateral from which users pump out of or have private ditches to flood irrigate with.

Table 17—Service Area 17

Delivery	Acres	Map/Tax Lot#	W/R Year	Last Name
MC-B-17HG-F	20.00	4N2517 0400	1909	Lopez
MC-B-17HG-F	36.80	4N2517 0500	1909/1968	Mendelez
MC-B-17HG-F	10.80	4N2517 600	1906	Hughes Trust (1/3), Majo
MC-B-17HG-F	2.00	4N2517 602	1906	Marquardt, Bill & Rena
MC-B-17HG-F	3.70	4N2517 603	1906	Marquardt, Betty
MC-B-17HG-F	5.70	4N2517 0700	1909	Lands
MC-B-17HG-F	1.30	4N2517 0701	1909	Madrigal
MC-B-17HG-F	5.00	4N2517 0802	1909	Carr
MC-B-17HG-F	17.50	4N2517 0900	1909	Lands
MC-B-17HG-S	17.50	4N2517 1000	1909	Gala Orchards
MC-B-17HG-S	16.00	4N2517 1005	1909	Gala Orchards
MC-B-17HG-F	4.30	4N2520B 0700	1909	Ramos
MC-B-17HG-F	4.60	4N2520B 0800	1909	Alvarez
MC-B-17HG-S	4.00	4N2520B 0900	1909	Gallaway
MC-B-17HG-S	3.10	4N2520B 1000	1909	Poulsen
MC-B-17HG-S	0.60	4N2520B 1100	1909	Poulsen
MC-B-17HG-F	7.50	4N2520B 1200	1909	Rahier
MC-B-17HG-F	5.00	4N2520B 1300	1909	Calvillo
MC-B-17HG-F	4.00	4N2520B 1400	1909	Sayles
MC-B-17HG-F	26.70	4N2520B 1600	1909	Murillo
MC-B-17HG-S	4.60	4N2520B 1700	1909	Johnson
MC-B-17HG-S	5.00	4N2520B 1900	1909	Akers
MC-B-17HG-S	1.20	4N2520B 1601	1909	Ashe
MC-B-17PS-S	5.50	4N2520 0701	1968	Hendricks
MC-B-17PS-S	9.00	4N2520 0703	1968	Sause
MC-B-17HG-S	5.00	4N2520 0708	1909	Arellano
MC-B-17HG-S	4.50	4N2520 0712	1909	Arellano
MC-B-17HG-F	17.80	4N2518 0100	1909	Baldock
MC-B-17HG-F	4.50	4N2518 0301	1909	McKinley
MC-B-17HG-F	17.90	4N2518 0400	1909	Baldock
MC-B-17HG-F	19.10	4N2518 0402	1909	Bither
Total Flood	*214.70*			
Total Sprinkle	*75.50*			
Total	**290.2**			

Recommended Improvements
Recommended improvements include replacing the open ditch with a pipeline. The 59.3 acres currently served by Lateral 18 could also easily be added to the service area for Lateral 17. This would allow the District to operate Lateral 18 as an emergency spillway.

All deliveries should be fit with a water meter for water measurement.

Service Area 17 was analyzed to determine pipe sizing which can be seen on Fig 17. The piping for Service Area 17 was sized for the potential of full acreage water rights to be added to the Carr property (tax lots 800 and 801), the Gala property (tax lot 1003), and the Marquardt property (tax lots 602 and 603.

Priority
The upgrade of Lateral 17 is seen as a high priority. The recommended improvements would result in increased water conservation with the elimination of delivery along the approximately 7,500 LF Lateral 18. Converting 214.7 flood acres to sprinkler irrigation will save 644 acre-feet of water. The lateral carries tailwater most times, which would be eliminated.

In addition to the water conservation, the District would also gain an emergency spillway in Lateral 18 which will be necessary for canal operation and maintenance.

Bev's Notes
Consideration of pressurizing lateral with variable frequency drive pump.
Service Area 17 south of canal private pumps.
Consider picking up the drainage water in Lateral 18 and put back into the system.