PURGATOIRE RIVER WATER CONSERVANCY DISTRICT
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December 24, 2018

Mr. Kirk Russell, Project Manager
Colorado Water Conservation Board
1313 Sherman Street, Room 719
Denver, CO 80203

Re: WSRA Grant – POGG1-774 Purgatoire River Water Conservancy District – Infrastructure Repair Project – Final Report

Dear Mr. Russell,

The purpose of this letter is to provide a final report regarding the Purgatoire River Water Conservancy District's (District) existing WSRA grant – POGG1-774. This grant was approved on April 21, 2016 and is scheduled to expire December 31, 2018.

The purpose of the District's Infrastructure Repair Project (Project) was to repair, replace or install new irrigation ditch infrastructure components. Eight specific tasks were outlined for the Project. Funding for the Project was provided by the participating District ditch companies, the District and the Colorado Water Conservation Board (CWCB). The infrastructure repair and replacement work envisioned under the Project has been successful and already beneficial to the participating District ditch company entities. Of the original 8 tasks detailed, 7 were completed as designed. The one not completed task was a minor one where the decision was made not to pursue that task under the proposed design.

Project Accomplishments

Specific task completion reports have been previously forwarded to the CWCB as tasks were completed for purposes of demonstration of completion of these tasks and for purposes of obtaining release of grant funding. That information will not be repeated in detail in this report but a summary of the following accomplishments achieved under the Project is provided below.

Task No. 1 - Picketwire Ditch Headgate.

Under this task a new concrete "floor" was installed on the bed of the Purgatoire River in front of the existing headgate. The purpose of this floor was to prevent seepage and erosion under the headgate frame area and to assist in keeping the area in front of the gates free from river debris and sediment. A vertical concrete wall was also constructed along the north bank of the river at this headgate location to prevent erosion around the headgate frame. This new wall section is anchored into existing boulders and railroad rail framework at this location. Lastly, a catwalk was installed on the face of the headgate frame to allow ditch personnel to safely remove any debris from in front of the headgates. For safety purposes metal railings and security fencing were installed atop of the headgate structure. As a highway rest stop or welcome center is being constructed adjacent to this headgate location, this additional safety fencing was deemed necessary to keep unauthorized persons as entering upon the headgate structure.

The concrete phase of this task was completed in the spring of 2018 and functioned well and as planned during the irrigation season. The metal work was completed in August of 2018.

Task No. 2 – Chilili Ditch Pipe Installation

This task consisted of the removal of several old ditch culverts in a section of the Chilili Ditch and the installation of approximately 650 feet of new 27" diameter plastic pipe. The purpose of this Project was to prevent soil and other material from falling into this ditch section from an adjacent steep slope area, plugging the ditch and then causing the ditch to overtop and fail. If this ditch section were to fail or overtop, water would flood onto an adjacent set of active railroad tracks.

This new piped ditch section was completed in May 2017 and functioned well and as planned during the 2017 and 2018 irrigation seasons.

Task No. 3 – Baca Ditch Siphon Protection

The Baca Ditch crosses the Powell Arroyo just northeast of Trinidad, Colorado by means of a ditch concrete siphon under the bed of this natural arroyo. Rain runoff events over the years have eroded this arroyo bed down to the point of exposing part of the top of this siphon. The purpose of this Project task was to key in a new layer of concrete above the siphon to vertically control the arroyo bed elevation and prevent further exposure of the siphon.

This protective layer of concrete was placed across the bed of the arroyo and vertically keyed into the channel along with being anchored into some existing railroad rail. Rip rap material was

further placed on top of this installation. This reinforcement structure performed well during the few rainstorm events which did occurred in this arroyo's drainage. 2018 was a relatively dry year so this structure has not yet been fully tested.

Task No. 4 – Enlarged Southside Irrigation Ditch Diversion Erosion Repair

The Enlarged Southside Irrigation Ditch diverts from the right bank of the Purgatoire River east of Trinidad Colorado. The right bank of this river was eroding to the south immediately downstream of the headgate and threatening the ditch itself. Task No. 4 was designed to remove some old existing erosion protection (old car bodies) and re-grade and re-slope this river bank area with new erosion protection material.

Work under this task consisted of removing any existing debris and old protection materials, re-sloping the area, installation of a fabric liner, installation of gravel, installation of boulders and finally regrading of the river bed and bank up onto the lower level of this reworked area.

Again, 2018 was a relatively dry year with low river flows. This work has yet to be fully tested.

Task No. 5 – Enlarged Southside Irrigation Ditch Railroad Crossing Culverts

Prior to leaving the immediate area of the Purgatoire River, the Enlarged Southside Irrigation Ditch crosses under a set of active railroad tracks by means of four large metal culverts and two 90° turns in the course of the ditch. The length of these culverts was minimal for the width of the railroad bed at this location such that any erosion around these culverts could endanger the railroad tracks. These 90° ditch course turns additionally induced deposition of sediments at this location.

Work under this task consisted of cleaning out existing sediments from the ditch, placing a concrete floor on the bottom of the ditch leading into the culverts and placing a vertical concrete wall on the left side of the ditch to protect against erosion. This new concrete ditch floor and wall was placed to both protect the culverts from erosion and to induce higher water velocities to reduce sediment deposition. Extensions were also installed on the up-ditch end of the culverts to move this area further from the railroad bed and finally encasing the culverts in a new concrete headwall, again to protect against erosion.

This installation has been in place for two irrigation seasons now and has functioned well and as anticipated.

Task No. 6 – El Moro Ditch – Hoehne Pipeline Association Headgate

The El Moro Ditch takes delivery of its water right water from a lateral headgate on the Picketwire Ditch. This lateral gate needed repair or replacement. Under the Project this lateral gate was to be replaced. Only $1,000 was allocated to this task.

Upon review and operational experience, it was determined that simply replacing this gate would not fully accomplish what is necessary at this location in terms of functionality, water rights administration, or safety aspects. It was determined that a concrete section approximately 10-15 feet long should be placed across the Picketwire Ditch at this location with a check dam installed in the ditch. Also installed on the right canal bank attached to this concrete section would be a new lateral gate to control El Moro Ditch water deliveries. An associated metal walkway for access, cleaning and safety would also be desired. The check dam would allow for diversions by the El Moro Ditch when no water was being taken by the Picketwire Ditch. As these additional aspects were not included in the original Project description insufficient funds were available so that this Project task was not pursued.

Task No. 7 – New John Flood Ditch Headgate

The New John Flood Ditch takes delivery of its water right water from a lateral off of the Model Canal. This lateral headgate no longer was able to close fully thus allowing Model Canal water to leak into the New John Flood Ditch.

Work under this task consisted of providing a new gate base and re-seating the gate to allow for full closure of this ditch gate. A new concrete pad was also placed upon the headgate area along with a new safety railing at the gate control wheel to prevent anyone from falling into the Model Canal.

This lateral gate is now fully functioning with the re-seating of this lateral gate allowing the ditch owner and water commissioner to fully curtail flows into this ditch as appropriate.

Task No. 8 – New John Flood Ditch Lietzendorfer Arroyo Flume

Task Number 8 under this grant was for the relining of the New John Flood Ditch Company's irrigation water flume over the Lietzendorfer Arroyo. The abrasive nature of sediments carried in this ditch's water eventually eroded the lining of this flume. Eventually leaks developed and water supplies were being lost.

This task consisted of placing and welding new sheet metal over the existing sheet metal bottom of this flume during April and May of 2017. This work was completed by the middle of May

2017 and irrigation water has been carried by this flume during the 2017 and 2018 irrigation seasons to date.

Project Finances and Costs

Funding for the original Project cost estimates was to be supplied by the individual District ditch companies, the District and the CWCB under its Water Supply & Reserve Account grant program. The ditch companies were to fund $32,500 of the Project, the District $82,500 with an additional $17,500 reserved for contingencies, and the CWCB $90,000 for a total Project funding amount of $222,500.

Actual costs of the Project ended up totaling $54,188 for the ditch companies, $84,171 for the District and $89,391 for the CWCB for total actual expenses of $227,750. These figures are contained in the two tables attached to this report.

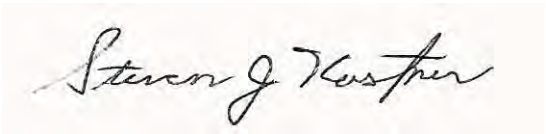
Actual cost variations from the initial Project estimates principally occurred under Task No. 5 where actual costs exceeded the estimated costs by $19,216. These additional costs were fully funded by the Enlarged Southside Ditch Company. The other significant cost variation occurred under Task No. 1. Actual costs exceeded the estimated costs for this task by $6,000. These increased costs were funded equally by both the Picketwire Ditch Company and the District.

Conclusion

Excepting for one minor task, this Project accomplished all of the objectives it was designed to complete. These infrastructure improvements are anticipated to serve the District and its ditch companies well into the future.

Lastly, appreciation by the District is expressed to the CWCB for participating in the funding for this Project, the Huerfano County Water Conservancy District for acting as the District's fiscal agent, the Arkansas Basin Roundtable for providing its support and to Kidd Engineering for providing engineering design services.

Sincerely,



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Steve Kastner, General Manager

Purgatoire River Water Conservancy District - Ditch Infrastructure Repair Project Estimated Costs by Contributor (8-16-2016)							
TASK	USE OF FUNDS	CONSTRUCTION COSTS (EST.)	PERCENT OF CONSTRUCTION COSTS	DITCH COMPANY FUNDING[1]	PRWCD FUNDING[1]	CWCB (WSRA) FUNDING[1]	TOTAL FUNDING
1	PICKETWIRE DITCH HEADGATE	$ 25,000	14.29	$4,640	$11,786	$8,571	$24,997
2	CHILILI DITCH	$ 42,380	24.22	$7,870	$19,979	$14,530	$42,379
3	BACA DITCH SIPHON PROTECTION	$ 12,660	7.23	$2,350	$5,968	$4,341	$12,659
4	ENLARGED SOUTHSIDE IRRIGATION DITCH DIVERSION EROSION REPAIR & DEBRIS REMOVAL	$ 31,090	17.77	$5,772	$14,657	$10,659	$31,088
5	ENLARGED SOUTHSIDE IRRIGATION DITCH RAILROAD CROSSING	$ 41,190	23.54	$7,648	$19,418	$14,122	$41,188
6	EL MORO - HOEHNE PIPELINE ASSOCIATION HEADGATE	$ 1,000	0.57	$190	$471	$343	$1,004
7	NEW JOHN FLOOD DITCH HEADGATE	$ 5,800	3.31	$1,078	$2,734	$1,989	$5,801
8	NEW JOHN FLOOD DITCH LIETZENDORFER ARROYO FLUME	$ 15,880	9.07	$2,952	$7,486	$5,445	$15,883
	TOTAL OF ESTIMATED CONSTRUCTION COSTS AND FUNDING	$ 175,000	100.00	$32,500	$82,500	$60,000	$175,000
	NON-CONSTRUCTION COSTS						
	Contingency @ 10%	-	-	$0	$17,500	$0	$17,500
	Engineering Services (Kidd Engineering & Construction Management LLC)	-	-	$0	$0	$27,000	$27,000
	Administrative Costs (Huerfano County Water Conservancy District)	-	-	$0	$0	$3,000	$3,000
	TOTAL OF ESTIMATED NON-CONSTRUCTION COSTS AND FUNDING			$0	$17,500	$30,000	$47,500
	TOTAL ESTIMATED COSTS AND FUNDING			$32,500	$100,000	$90,000	$222,500
1. Per April 21, 2016 CWCB Notice to Proceed Letter.						Updated	8/18/2016

Purgatoire River Water Conservancy District - Ditch Infrastructure Repair Project										
Actual Costs by Contributor (12-26-2018)										
TASK	USE OF FUNDS	PERCENT OF CONSTRUCTION COSTS	DITCH COMPANY			PRWCD			CWCB (WSRA) COSTS	TOTAL COSTS
			COSTS	CONTINGENCY	TOTAL	COSTS	CONTINGENCY	TOTAL		
1	**PICKETWIRE DITCH HEADGATE**	15.70	$4,640	$3,000	$7,640	$11,786	$3,000	$14,786	$8,571	$30,997
2	**CHILILI DITCH**	21.47	$7,870	$0	$7,870	$19,979	$0	$19,979	$14,530	$42,379
3	**BACA DITCH SIPHON PROTECTION**	5.83	$2,135	$0	$2,135	$5,421	$0	$5,421	$3,944	$11,500
4	**ENLARGED SOUTHSIDE IRRIGATION DITCH DIVERSION EROSION REPAIR**	15.42	$5,650	$0	$5,650	$14,347	$0	$14,347	$10,433	$30,430
5	**ENLARGED SOUTHSIDE IRRIGATION DITCH RAILROAD CROSSING**	30.60	$7,650	$19,216	$26,866	$19,418	$0	$19,418	$14,122	$60,406
6	**EL MORO - HOEHNE PIPELINE ASSOCIATION HEADGATE**	0.00	$0	$0	$0	$0	$0	$0	$0	$0
7	**NEW JOHN FLOOD DITCH HEADGATE**	2.94	$1,078	$0	$1,078	$2,734	$0	$2,734	$1,989	$5,801
8	**NEW JOHN FLOOD DITCH LIETZENDORFER ARROYO FLUME**	8.04	$2,949	$0	$2,949	$7,486	$0	$7,486	$5,445	$15,880
	TOTAL OF ACTUAL CONSTRUCTION COSTS AND FUNDING	100.00	$31,972	$22,216	$54,188	$81,171	$3,000	$84,171	$59,034	$197,393
	NON-CONSTRUCTION COSTS									
	Contingency @ 10%			(SEE ABOVE)			(SEE ABOVE)			$0
	Engineering Services (Kidd Engineering & Construction Management LLC)								$27,357	$27,357
	Administrative Costs (Huerfano County Water Conservancy District)								$3,000	$3,000
	TOTAL OF ACTUAL NON-CONSTRUCTION COSTS AND FUNDING								$30,357	$30,357
	TOTAL ACTUAL COSTS AND FUNDING								$89,391	$227,750
	1. Task not pursued due to insufficient task design. Preferred task work will require greater funding.									
									Updated	12/24/2018

TASK NO. 1 - PICKETWIRE DITCH HEADGATE	
	
Picketwire Ditch headgate – pre-construction.	Picketwire Ditch headgate – post-construction.

TASK NO. 2 - CHILILI DITCH PIPELINE SECTION	
	
Chilili Ditch section – pre-construction.	Chilili Ditch section – 30” diameter pipe construction.

TASK NO. 3 - BACA DITCH SIPHON PROTECTION	
	
Baca Ditch Siphon – Pre-constrution. Exposed railroad rail and siphon.	Baca Ditch Siphon – During construction. Key wall beginning to be formed.

TASK NO. 4 - ENLARGED SOUTHSIDE IRRIGATION DITCH DIVERSION EROSION REPAIR	
	
Southside Ditch headgate downstream area – pre-construction.	Southside Ditch headgate downstream area – post-construction.

TASK NO. 5 - ENLARGED SOUTHSIDE IRRIGATION DITCH RAILROAD CROSSING	
	
Enlarged Southside Irrigation Ditch Railroad Crossing, pre-construction and post-construction.	

TASK NO. 6 - EL MORO - HOEHNE PIPELINE ASSOCIATION HEADGATE	
No work was conducted on this Task No. 6.	

TASK NO. 7 - NEW JOHN FLOOD DITCH HEADGATE	
	
John Flood Ditch headgate pre-reconstruction.	John Flood Ditch headgate, reconstructed with new concrete pad (mostly covered with soil) and new gate floor (not visible).

TASK NO. 8 - NEW JOHN FLOOD DITCH LIETZENDORFER ARROYO FLUME	
	
John Flood Ditch Lietzendorfer Arroyo flume. New sheet layer of steel lining being placed (bright orange rust area).	

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