

OPEN LATERAL CONVERSION TO PIPELINE

KANSAS BOSTWICK IRRIGATION DISTRICT NO. 2

COURTLAND, KANSAS

MAY 4, 2010

TABLE OF CONTENTS

Cover Page	
Assurances Forms	
Title Page	
Table of Contents	page 2
Executive Summary	page 3
Background information	page 5
Technical Proposal	page 7
Description of Projects	page 11
Benefits, Impacts, Permits, Funding Plan	page 13
Budget Forms	page 14
Budget Narrative	page 16
Official Resolution	page 18
Appendix	

Bury Courtland West Lateral 4.0, Courtland West Lateral 5.7

Application for WaterSMART funds Water 2025
Opportunity # R10SF80157 May 4, 2010

EXECUTIVE SUMMARY:

Kansas Bostwick Irrigation District #2 is located in Courtland Kansas. Kenneth Nelson is the Superintendent and Project Manager and can be reached by telephone at 785-374-4514 or by e-mail at kbid@courtland.

The proposal will allow for the burial of two large laterals totaling 5.4 miles. This would be under Task A Water Conservation of the WaterSMART proposal. This would eliminate 2 large waste-ways and eliminate seepage and operational losses. Metered turnouts would be installed vastly improving water control and accounting. This would move the district from 70+ to 76 miles of pipe in 2 years and would include more complicated projects than most of the previous ones.

The district base supply is 15"/acre. When adequately supplies exist, 100,000 acre-feet is the average annual water supply.

Losses of 1 cfs - 2 af/day per mile are common in the district. Savings of 864 af/yr will be realized by pipe alone. Another 500 af estimated savings would occur in improved management and turnouts. These savings are based on an 80-day irrigation season. The proposal will deliver water to 1,782 acres for 24 landowners. One owner has committed to installing a pivot if the pipeline is installed. There are six additional owners who may install pivots an on farm saving of 120 to 700 af of additional savings will be realized by conversion to pivot irrigation. Total estimated savings are 2,064 af/year. The expected life of pvc pipe is 50 years. Multiplying the 2,064 af of savings from pipe, Improved service, and on farm efficiency, time 50 years gives one 103,200 af. Considering the project cost of \$765,590.00, the cost per acre foot saved is \$7.42/af. However subtracting \$5,000/year savings in canal maintenance (spraying etc) from the cost of the project, the cost drops to \$5.00/af.

The project will begin 10-01-2010 and be completed by 9-30-2012. The district will be prepared to begin the project on the earliest

date possible in the fall of 2010 and will complete all 3 pipelines by the end of September 2012.

Funding being sought under WaterSMART would be \$300,000 from Reclamation (39.1%) and \$465,590 (60.9%) district funds for a total budgeted cost of \$765,590.00.

BACKGROUND INFORMATION:

The district is served by flows of the Republican River and White Rock Creek. Storage of the district is in the Corps of Engineers Harlan County Reservoir in Nebraska and in Lovewell Reservoir in Nebraska. The district holds Water Rights #385 and 4673 with the State of Kansas. See attached map in the appendix for more particular description of the area and the projects.

Kansas Bostwick Irrigation District is a Pick Sloan Missouri Basin Project consisting of 250 miles of canals and laterals providing service to 42,500 acres in Republic and Jewell Counties of Kansas. The district is in the Nebraska - Kansas Project Area

headquartered in Grand Island Nebraska. The Headquarters of the District are in Courtland Kansas.

The principal crops grown are corn, soybeans, and alfalfa. There are approximately 350 landholders in the district. The base supply to the irrigator is 15"/acre. Because of water shortages caused by ground water depletions of the stream flow, our projection is to meet our current demand of 100,000 af available water supplies.

There are 100 miles of main canals and 150 miles of laterals. As of this application, 70 miles of laterals have been buried to pipe. In the past 15 years 50% of the district has converted from flood to pivot irrigation.

The Republican River Basin remains embroiled in controversy over groundwater depletion of river flows. A Supreme Court Settlement between the States of Colorado, Nebraska and Kansas is involved. Nebraska and Colorado have not delivered the prescribed water to Kansas. Both States are working on but do not have a clear plan on how to deliver Kansas its share according to the terms of the Republican River Compact and the settlement. In 2004 and 2005 the irrigators above Lovewell did not receive any water and irrigators below Lovewell only a 50% supply because Harlan County supplies were exhausted. In 2006 and 2007 the State of Nebraska made deals with irrigation districts in Nebraska allowing a partial supply to be delivered to Kansas Bostwick. These years of no or very low supplies caused other users such as recreationist to blame irrigation for low lake levels. The only tool Kansas Bostwick has to answer the controversy is by improving our efficiency and conserving water.

Kansas Bostwick is the first water right holder on the Republican in the State of Kansas. Kansas Bostwick is obligated to conserve its supply and make valuable use of its share of the Republican River flows. Along with this, Kansas Bostwick has a contractual commitment to Reclamation to improve efficiencies. Buried laterals are the highest priority in Kansas Bostwick's conservation plan.

Much improvement has been realized with past and present accomplishments. The projects left are larger and more expensive ones beyond the districts ability to accomplish without additional funding. It will be difficult to meet the contractual obligation if these large laterals are not buried.

As Kansas Bostwick conserves its supply, other users will receive benefits of longer lasting supplies for fish, wildlife, and recreational benefits at the reservoirs. The most immediate way to conserve water is the burial of laterals in the Kansas Bostwick system. It will be essential to be efficient with water delivered from other states to comply with the Republican River Compact. In years of adequate or more than adequate rainfall if groundwater depletions are not an issue, the savings will add to the supply of the river downstream and allow additional fall

recreation benefits when lakes are typically low. In years of drought, it will conserve the finite supply and allow for quicker recharge of the reservoirs if they are not drawn down to the empty stage.

On the State and local level, Kansas Bostwick's conservation program is viewed as aggressive. Other users of Republican basin water from Topeka Ks. to Lincoln Ne. recognize Kansas Bostwick's accomplishments and it's goal of better management.

During the contract renewal process, no endangered species were identified on the Republican.

Kansas Bostwick has participated in numerous field service cooperative agreements with Reclamation. Under 2025 challenge grant applied for in 2006 and approved in 2007, 9 miles of laterals will have been buried by the fall of 2010, finishing the grant. An estimated 10 miles of laterals have also been buried under Field Service Agreements in the last 15 years. In addition, the district has buried 50 miles of laterals without assistance from Reclamation. A very good working relationship exist with the Area office in Grand Island Nebraska. Environmental, cultural, and engineering advice is readily available from the staff.

TEHCNICAL PROJECT DESCRIPTION:

Kenneth Nelson, Superintendent of the District and Project Manager will be in charge of all aspects of the project. Randy Evert is the District Foreman in charge of field operations and Don Lieb is the Office Manager in charge of accounting.

The project will include three major tasks as follows: 1. Preparation of the site; 2. Laying the pipeline and installing turnouts; and 3. Finishing the project after the pipe is laid. As a general rule task 1 represents 30% of the project, task 2 60%, and task 3 10% of the project. The District has a full line of equipment for this type of operation as described on the Equipment List included with this proposal. Task 1 preparation includes dozer and patrol work to prepare the alignment of the proposed line and excavator work to remove existing structures. Removed structures will be broken with the District crane and wrecking ball if they are too large to load and haul. Structures will be loaded with the District loader into dump trucks and taken to an established scrap yard. Also included in task 1 is the stockpiling of pipe to be used on the project. Task 2 includes the use of the District trencher to trench the line for the pipe. A dozer or patrol is used to backfill the trench. An excavator with a sling is used to swing the pipe into the trench and align the pipe to be pushed together. Task 3 includes picking up any and all scrap or excess material left on the site and leaving the site in a manner that the landowner can work it with his farm equipment. Any open lateral, which was not in the alignment of the pipeline, will be destroyed in task 3 and left in a manner

that the landowner can work the area with his farm equipment.

Work will begin on each lateral and task as follows if the application is successful:

Courtland West 5.7 Lateral

Task 1 - all design, engineering, environmental and cultural compliance, and supplies will be purchased prior to 10-1-2010 allowing physical preparation of the site to begin immediately and continue for 30 days at which time task 1 would be completed.

Task 2 - installation of pipe will begin within a week of the beginning of task 1 and be performed at the same time as task 1. Task 2 should be completed by March 15, 2011.

Task 3 - Will begin as task 1 is completed. Task 3 will be completed by May 15, 2011 or as soon as possible after task 2 is completed. The pipelateral 5.7 shall be operational for the 2011 irrigation season.

Courtland West 4.0 lateral

Task 1 - Begin design, engineering, environmental and cultural compliance at the same time frame as 5.7 lateral in the fall. All material will be purchased before Jan 2011. Begin field preparation as soon as possible after irrigation season is over and crops are removed from the field. Task 1 field work will begin along the initial 628' where 27" pipe will be installed and on the 4.0-0.4 sublateral which can be worked before the crops are removed. The remaining task 1 field work will be begin as soon as harvest is over in mid October.

Task 2 - as soon as task 1 field work has began, begin trenching and laying pipe. Pipe will not be laid during freezing temperatures. By March 15 2012, trenching and laying should be completed.

Task 3 - will begin immediately following the beginning of task 2. All turnouts will be operable by June 1, 2012. If finish work is not complete by the beginning of irrigation season near June 15, it may be completed following watering season in September.

At the point where pipe laterals connects to the Courtland West Canal, aeration screens will be installed in front and connected to the existing constant head orifice turnout. The back gate of the turnout will be left in tack as a pipeline shut off gate for repairs to the line. The gate will be completely open during operations to allow for maximum flow to the pipeline. The concrete transition on the backside of the turnout will be removed and connected to 80 psi PIP PVC.

The pipelines will be buried on existing right of way except situations where substantial savings are realized by new alignments. Easements will be taken for any new alignment. Pipe will be shoved through the existing concrete pipe under the county

roads and encased as required by the county. Turnouts will be installed off the pipeline where current one exists or in strategic locations for improved service. Proper grade will be established using the districts laser instrument connected to the trencher. Vent-vacuum devices will install where necessary.

Kenneth Nelson Superintendent designed the pipelines. If the application is successful, an Engineer will review them. All pipes shall be installed following manufactures design criteria. Velocity is the primary factor determining pipe size. Compaction around the line and proper depth of coverage will be accomplished. All pipes will be 80 psi PVC with gasket bells. Elbows and fittings will be either solvent weld or gasket as needed at each application. Thrust blocking will be applied where necessary. Turnouts will consist of underground valves with wheel operators to prevent fast on or offs creating possible water hammer. Lines will lead from valves to meter tubes with propeller meters. All meter installations shall meet State of Kansas specifications for meter installations.

Open laterals carry a standard 30% loss factor. These also have daily used waste ways, which will be eliminated.

Along with water savings these projects save operations and maintenance cost for the district. All open laterals are sprayed with soil sterilant before the beginning of watering season with a follow up application of rodeo where needed. In most years, an application of moss treatment is also needed in open laterals and spot broadleaf spraying is practiced for weeds on the right of way outside the lateral interior. An estimated \$5,000 to \$7,000 will be saved on these applications.

On farm conversion to pivot irrigation will be made possible and by these pipelines. The removal of the open lateral and increased head pressure to the turnout greatly encourages conversion to pivot. With a pivot, a daily flow of 1.5 cfs will suffice for 130-acre field. Pivots in this district tend to use 9"/acre in a year where 15" would be required for the same number of acres under flood irrigation. Delivery of water through the pipeline also increases the speed of delivery with the ability to turn on all turnouts on the pipeline in a short period of time. The open lateral system required the physical moving of the water up and down the lateral and proper setting at each check structure. Each meter gate turnout had to be set and rechecked to see that the head was maintained. With the metered pipeline, each turnout can be set in a manner of minutes and the irrigators can check the dial on the meter to be assured the flow is correct. At the same time, the district employee can check the acre-foot counter on the meter to be sure the flows remain constant.

Operation comparisons of the past years operations on the laterals including waste and loss records can be compared to identify savings described above.

The district has a complete line of machinery and experienced personnel for these projects. The districts Hydramaxx trencher which was purchased in 1999 through a cooperative agreement with Reclamation, is the key to being able to lay this large pipe in a 2 year time frame. Use of the trencher equipped with a laser level is much more efficient than excavator trenching. The district has installed large pipe in the past and its employees are skilled in the process.

The ability to install 2-3 miles of lateral in a 3-month period is well within the districts ability weather permitting. The district must operate and maintain the rest of its system as well as accomplish buried pipelines. The weather would be the biggest limiting foreseeable factor.

The Courtland West 4.0 and 5.7 laterals are in close proximity to the district yard in Courtland Kansas. The Courtland West 5.7 projects can be started before the crops are removed from the fields. The initial portions of this lateral does not disturb access to or ability to harvest crops.

Funding for the projects will come from the irrigation districts conservation reserve funds of \$125,000.00 (see appendix), O&M funds raised on annual basis, and WaterSMART funds as requested in this application. The Board of Directors charges each irrigator receiving a benefit from these projects a fee for their benefit. This will not be considered in the application and will be a portion of the districts share. In the event they do not agree, alternate projects of the same size and nature will be substituted (see map in appendix)

DESCRIPTION OF PROJECTS:

The **Courtland West 5.7** project is located $\frac{1}{2}$ mile west of the town of Courtland and runs east on the south edge of the town of Courtland and on east and south to the end of the lateral near Beaver Creek. The lateral measures 13,311' or 2.52 miles in length. There are 8 landowners receiving water from the lateral to irrigate a total of 594 acres. There is one sub laterals off 4.0 which has been previously buried. There will be 31 elbows and fittings and 11 turnouts off the lateral. The total demand is 19 cfs and the total useable head is 26.8'. The velocity rating of 80 psi pvc pipe is the limiting factor on pipe size. The initial pipe will be 27" diameter. The connection to the present Constant Head Orifice turnout will allow for the turnout gate to be used to open and close the line for repairs. Once the line is filled before watering season, the gate will be left open. Forty feet of aeration screen will be installed inside the Courtland West canal and connected to the turnout to screen all trash and debris for the pipeline. This also prevents fish crawdads and others from entering the pipeline and being abandoned in the fields. Two 27" elbows will be installed to match the angle in the present lateral. The first turnout is 385' downstream from the headgate. A 27"x10" T will be installed to accommodate the turnout. All turnouts in this proposal will include 10" pipe, high-pressure underground valve with Vanstone flanges, 2-90° elbows, 10" reverse option flow meters in meter tubes with straightening vanes, which meet Kansas Department of Water Resources specifications. Immediately after the first turnout, the pipe may be reduced to 24" as the demand drops to 17.5 cfs with the velocity rating allowing 24" pipe. The line remains 24" for 4,942' delivering water to an additional 3 turnouts to that point. The line will be coupled and pushed through 30" cement pipe crossings at the railroad track and the county road crossing. The pipeline is reduced to 21" for 100' and another turnout installed allowing it to be reduced to 18" for 3,277' connecting to sub lateral 1.5 already buried and to 1.5 turnout lowering the demand to 5.8 cfs Reducing the pipe size to 15" for 3,706' reducing the pipe size to 12" for the remaining 951'. Vents will be installed as needed throughout the project. A total of 11 turnouts will be installed and 31 elbows and fittings.

The **Courtland West 4.0** project begins 1 mile north, 1 mile west, $\frac{1}{4}$ mile north of Courtland then northwest along the Courtland West Canal to the 48" headgate turnout. The pipeline will be 15,487' (2.93 miles) long with 11 turnouts 31 elbows and fittings serving 16 landowners and 1,188 acres of irrigated land. A portion of the Lateral was previously buried serving 5 landowners and 400 acres.

The demand will include all acres served. The total demand on the pipeline is 22.5 cfs. and the total useable head is 61.7'. Sixty feet of aeration screen will be placed in the Courtland West main canal to screen the water as previously described. The pipeline begins with 628' of 27" pipe. The pipeline is connected to the 4.0-0.1 sub lateral previously buried and 1 turnout is installed off the 27" pipe. After crossing the county road, fittings will be installed to serve 4.0-04 sub lateral to the southeast along the existing right of way in 10" pipe and a fitting to the north in 15" pipe 200' in the current right of way then turning to the east on the ¼ mile line. At this point, a 10" line tees off the 15" line running to the 4.0-0.6 sub lateral previously buried. The is then reduced to a 12" line for 1300' servicing a pivot turnout and is then reduced to 10" for 1300' returning to the existing right of way at an existing pivot turnout. Returning to the main line by the county road, the line may be reduced to 21" because of the drop in demand to the sub laterals. The 21" line will run southeast 2800' intersecting and running with the existing right of way 200' crossing under US Highway 36 through the existing cement tube crossing. At this point a field turnout is installed and the pipe is reduced to 18". The pipe then runs southeast in a straight line adjoining the existing right of way at the point it crosses Ks Highway 199. The 18" line continues 1600' southeast to the existing right of way connecting to 4.0-2.3 sub lateral previously buried and to the existing pivot turnout at that location. The pipeline is then connected to a portion of the 4.0 lateral previously buried at 4.0-2.3 location. The pipeline is reconnected to the portion previously buried at location 4.0-2.4 with 15" pipe. The 15" pipe runs southeast 2,100' to the existing 4.0 right of way paralleling the county road for 300' where 2 turnouts are installed at the end of the pipeline.

Post project benefits:

Comparisons from past years records will be used to quantify benefits. Efficiency of each ditchrider area is kept on an annual basis. Improved efficiency in loss and evaporation will be noted. Pivot installations and improved on farm efficiency will also be noted.

Environmental Impacts:

A 2% contingent has been allowed for any and all permitting required. As previously stated, no endangered species were identified during contract renewal. All construction is in rural areas on easement ground and will be utilized by the owner under terms of the easement. Impacts on air, water quantity or quality will be minimal. Abundant habitat adjoins the area. No wetlands are involved in the project. The delivery system was constructed in or about 1958. No major alteration has previously occurred. There are no known Historic places or archeological sites in the project.

Required permits:

Reclamation will conduct cultural research before the projects begin. All utilities will be contacted through Kansas Dig Safe or by direct contact. Republic County will be notified regarding road crossings.

Funding Plan:

The district will fund its portion through in kind services and in cash purchases. There is \$125,000 in conservation reserves. The remaining amount needed by the district will be raised in annual operations and maintenance assessments. Once the application is approved, both office and field work will begin to assure the project can be completed on time. This task 1 work shall be included in the project. Irrigators involved will contribute towards the districts share as negotiated with the district once the grant is approved. Their contribution will be to the district and considered part of the district share, no letter of commitment is needed. Funding totaling \$759,590 is required for the project. The request upon Reclamation is for \$300,000.00 (39.1%) with the district picking up the remainder. Under no circumstance would the district contribute less than 50% of the project.

APPENDIX

Map of Project

Lateral Project Material

Project Wages and Salaries

Project Equipment and Construction Rates

Savings Conservation Funds

Letter of Support