

# OPEN LATERAL CONVERSION TO PIPELINE

KANSAS BOSTWICK IRRIGATION DISTRICT NO. 2

COURTLAND, KANSAS

MAY 2, 2006

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## Part i -- EXECUTIVE SUMMARY

### A. General Project Information

A.1	<p>Date: May 2, 2006  <b>Applicant Name:</b> Kansas Bostwick Irrigation District</p> <p style="text-align: center;">Courtland City, Republic County, Kansas</p>																						
A.2	<p><b>Proposal Name:</b> Open Lateral Conversion to Buried Pipe</p>																						
A.3	<p><b>2006/2007 Funding Request Summary</b></p> <table border="1" data-bbox="370 577 1198 976"> <thead> <tr> <th data-bbox="370 577 889 613">FUNDING SOURCE</th> <th data-bbox="889 577 1198 613">FUNDING AMOUNT</th> </tr> </thead> <tbody> <tr> <td data-bbox="370 613 889 646"><b>Non-Federal Entities:</b></td> <td data-bbox="889 613 1198 646"></td> </tr> <tr> <td data-bbox="370 646 889 680"></td> <td data-bbox="889 646 1198 680" style="text-align: right;">\$732,892</td> </tr> <tr> <td data-bbox="370 680 889 714"></td> <td data-bbox="889 680 1198 714"></td> </tr> <tr> <td data-bbox="370 714 889 747"></td> <td data-bbox="889 714 1198 747"></td> </tr> <tr> <td data-bbox="370 747 889 781"></td> <td data-bbox="889 747 1198 781"></td> </tr> <tr> <td data-bbox="370 781 889 814"><b>Non-Federal Subtotal:</b></td> <td data-bbox="889 781 1198 814" style="text-align: right;">\$732,892</td> </tr> <tr> <td data-bbox="370 814 889 848"></td> <td data-bbox="889 814 1198 848"></td> </tr> <tr> <td data-bbox="370 848 889 882"><b>Reclamation Funding:</b></td> <td data-bbox="889 848 1198 882" style="text-align: right;">\$300,000</td> </tr> <tr> <td data-bbox="370 882 889 915"></td> <td data-bbox="889 882 1198 915"></td> </tr> <tr> <td data-bbox="370 915 889 949"><b>TOTAL PROJECT FUNDING:</b></td> <td data-bbox="889 915 1198 949" style="text-align: right;">\$1,032,892</td> </tr> </tbody> </table>	FUNDING SOURCE	FUNDING AMOUNT	<b>Non-Federal Entities:</b>			\$732,892							<b>Non-Federal Subtotal:</b>	\$732,892			<b>Reclamation Funding:</b>	\$300,000			<b>TOTAL PROJECT FUNDING:</b>	\$1,032,892
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A.4	<p>An official Resolution is included</p>																						
A.5	<p>The proposal will allow for replacing 9.3 miles of open lateral to buried pipe with metered turnouts replacing original turnouts mostly metergate structures. This encompasses 7 current laterals all of which contain operational spillways. Seepage and losses run in excess of 30% on all these not including operational spills in the 10% range. Water savings and modernization of the system are extremely important not only to help the District preserve it's water supply but to assure other users such as fish and wildlife, recreational, municipal and others that we are making every effort to conserve the basin supply thus avoiding conflict.</p>																						
A.6	<p>This proposal is being submitted under Task Area C &amp; D.</p> <p>Conversion of open ditch to pipe saves a minimum of 30% based upon seepage and loss alone. Additional savings of approximately 10% will be realized by elimination of operational spillways. Installation of metered turnouts eliminates gates errors and accounts for water actually passing the meter to the farm. Simplifying the ditch rider's task and giving them more time to improve their operations on their entire ride.</p>																						
A.7	<p>Name: Kenneth Nelson          Title: Superintendent          Telephone: 785-374-4514          E-mail: <a href="mailto:kbid@courtland.net">kbid@courtland.net</a></p>																						

<b>B. Summary of Project Criteria.</b>	
<b>B.1</b>	<b>Conservation, Efficiency, Markets</b>
<b>B.1.1</b>	There are no water markets being considered or authorized at this time
<b>B.1.2</b>	<p>The District's base supply is 15"/acre. When adequate supplies exist, 100,000 acre feet is the average water supply.</p> <p>In general, loss of 1 cfs. – 2 af. per mile are common in this district. Savings of 1,376 af will be realized by pipe alone. Another 500 to 700 af. would be estimated by improved turnouts and management of flows. These savings will be realized during the irrigation season only which is estimated at 80 days. Open laterals must be primed for delivery even when deliveries are not being made. Pipe will eliminate this. Kansas Bostwick has buried laterals and can verify these savings as typical throughout the district.</p>
<b>B.1.3</b>	<p>This proposal delivers water to 2,650 acres many of these producers will be encouraged to convert to pivot irrigation thus lessening their demand by 45-50%. If 50% of the irrigator convert to pivot, it would save 1800 af /yr. Also, ease of operations and water accounting will be greatly improved.</p> <p>Metered turnouts will eliminate incorrect turnout settings or tampering.</p> <p>Plastic pipe life expectancy is generally given as 40-50 years by manufactures.</p>
<b>B.2</b>	<b>Relevance to Water 2025</b>
<b>B.2.1</b>	<p>The Republican River Basin is working through a Supreme Court Settlement over flows coming from Colorado and Nebraska into Kansas. The District has made Contract commitments to the Bureau of Reclamation to improve efficiencies and share shortages of water with other users. The best method of improved efficiency and water conservation is in converting open laterals to pipe and in converting gravity irrigation to pivot irrigation. All users of water view these projects positively. Without them, the settlement may not be achieved, conflict will increase and our efforts to collaborate with other users will fail.</p> <p>The water savings will lessen the demand in Harlan County Reservoir and Lovewell Reservoir thus allowing more and longer lasting supplies for fish, wildlife, and recreational users.</p> <p>Spillways from Kansas Bostwick return to streams. Seepage tends to cause high ground water problems whereas the area commonly has a clay barrier. This District has 150 miles of tile drains because of this. There is very little ground water available to irrigation in this district. So ground water recharge is not a factor.</p>
<b>B.2.2</b>	<p>This area is an extreme area of tension that cumulated in a Supreme Court Case. A settlement has been reached but the success of the settlement is shaky at best. Our area is rural and not heavily populated but it is a very hot spot when it comes to water issues. Great tension exists between the States. The only thing keeping conflict from other users principally recreation, fish and wildlife from exploding is the faith that these types of projects will be accomplished.</p>

<b>B.2.3</b>	<p>Recreation, Fish, and Wildlife users have been appeased through 2000 Contract renewal which developed share shortage plans in the reservoirs and committed the districts to improved efficiency goals. The goals will not be met without the continuation of these types of projects.</p> <p>The irrigators receiving benefits from the pipeline will contribute to the project. This will be included in the Districts share of the commitment.</p> <p>A letter of support from David Pope, Chief Engineer, Division of Water Resources is included.</p>
<b>B.2.4</b>	This is a Reclamation Project
<b>B.3</b>	<b>Demonstrated Results</b>
<b>B.3.1</b>	<p>Burying laterals is a primary part of Kansas Bostwick Irrigation District's Conservation Plan. These projects are large more expensive projects which the district cannot fund under its current plan.</p> <p>The District designs its pipe laterals using manufactures design criteria. More specific design work will be conducted and included in task 1 of each project</p> <p>Kenneth Nelson Superintendent, 29 years experience in designing and overseeing pipe lateral projects and installation of metered turnouts. Manufacture's design criteria are used for design work.</p>
<b>B.3.2</b>	Direct project benefits of app. 2000 af/yr are arrived at by comparison of previously buried laterals throughout the district. Conversion of gravity to pivot irrigation has demonstrated 40-50% reduction in use throughout the district. Approximately 40% of the district has converted to pivot in the last 15 years and the results are proven by their performance.
<b>B.3.3</b>	Use and loss will be compared to historical records.
<b>B.4</b>	<b>Project Financing and Cost-Sharing</b>
<b>B.4.1</b>	<p>The funding plan describes the project is to be funded from 2025 grant funds, District conservation reserve funds, and District O&amp;M funds as part of our conservation plan.</p> <p>2000 Contract with the Bureau of Reclamation developed a revolving fund for conservation along with commitment to conservation in regular O&amp;M funds. The District currently has \$288,000 in revolving fund to dedicate to this project. See Savings Conservation funds in the Appendix.</p> <p>The District does not anticipate increasing O&amp;M for this project whereas annual O&amp;M spending on buried lateral projects is already part of our O&amp;M. This project will allow us to tackle the larger more expensive projects for the same annual O&amp;M expense we are currently spending. Operations of these pipeline systems will save app \$5,000/year over open lateral system.</p> <p>No letters of commitments are included. If the grant is successful, the District will negotiate with irrigators to determine the amount of their involvement. The irrigators will pay the District thus becoming part of the District contribution. If irrigators do not cooperate to the</p>

	Districts satisfaction, other lateral projects with similar pipe sizes, costs, and water savings may be substituted where irrigators are willing to contribute. Under no circumstance will the District contribute less than \$300,000 over the 2 year period of construction.
<b>B.4.2</b>	Environmental contingency cost of 2% are included in task 1
<b>B.4.3</b>	The district intends to contribute 70% if the entire \$300,000 is granted
<b>B.5.</b>	<b>Other Factors</b>
<b>B.5.1</b>	This District has participated in Cooperative Agreement since 2002 allowing it to bury other laterals on the project. The District has approximately 150 miles of laterals and has currently buried 47 miles. Approximately 10 miles (4 projects) of these have been buried with assistance of Cooperative Agreements through Reclamation. These 4 projects were large projects which the District could not afford to undertake without assistance. This Cooperative Agreement was granted to the Irrigation Projects Reauthorization Council and the funding \$20,200 annual funding expires in 2006. Kansas Bostwick was also the recipient of a Cooperative Agreement which helped with the purchase of a \$220,000 trencher. The District received a total of \$75,000 over 5 years from this Agreement starting in 1999.

<b>part II -- TECHNICAL PROPOSAL</b>	
<b>A.</b>	<b>Background Data .</b>
<b>A.1</b>	Pipelines to be constructed in Republic and Jewell Counties of Kansas. Nearest towns include Superior Nebraska., Courtland Kansas, and Scandia Kansas. All proposals are less than 10 miles from these towns. See map in Appendix.
<b>A.2</b>	The water supply is from the Republican River Basin. Storage releases include Harlan County Reservoir in Nebraska and Lovewell Reservoir in Kansas. The District holds Kansas Water Rights # 385 and #4673. All use is irrigation. Kansas Bostwick has over 350 landholders. There are 32 landowners involved in the proposal. Water savings will be shared by all landholders.
<b>A.3</b>	The District serves 42,500 acres. The major crops are corn, soybeans and alfalfa.
<b>A.4</b>	The District has 100 miles of canals and 150 miles of laterals. Of the 150 miles of laterals, the district has buried 47 miles mostly since 1990 as part of its Conservation Plan. The District also operates and maintains over 150 miles of tile drains.
<b>B.</b>	<b>Project Description</b>
<b>B.1</b>	The proposal encompasses 7 lateral systems. The first task will be to complete design and environmental requirements and prepare the path of the pipeline. Most of the systems will be following the existing right of way. Three laterals will have deviations to shorten the pipeline improving the alignment and allowing additional head on the pipeline. All current right of way is easement and any new right of way taken will also be easement. All construction will be accomplished with Kansas Bostwick employees and equipment. Task one will require dozers, grader, excavators, loaders and dump trucks. As soon as the irrigation season is over, existing laterals will be reconfigured to allow a graded line to trench in the pipeline. All turnouts and structures will be removed. Where road crossings are involved, wherever possible, the existing cement pipe structure under the road will be left and the PIP pipeline will be incased in it to provide cured road crossings. The 2nd task will involve trenching and laying the pipeline. The District owns a 1999 Hydramaxx trencher purchased with help from a Cooperative Agreement from Reclamation. The trencher along with dozers, loaders, and excavators will be used in this task. As the trenching process is completed, pipe will be installed in the trench by District employees. Fittings and turnouts will be installed as the pipeline progresses at the appropriate locations. The 3 <sup>rd</sup> and final task includes backfilling the trench and cleaning up the work area to allow it to be utilized by the landowner. This task will involve dozers and a grader.
<b>B.2</b>	The District can install 2–3 miles of pipeline per season weather permitting. The schedule will be proposed to start as soon as possible after approval of the grant. If this were the fall of 2006, two projects would be targeted for completion by December 2006. As soon as weather permits construction will begin again in the Spring of 2007 with another Lateral being completed by April 2007. Two more in the fall of 2007 scheduled for completion by December 2007. One in the Spring of 2008 and one in the fall of 2008 completing all projects by December 2008.
<b>B.3</b>	These projects must be completed before watering seasons begin. This eliminates 4 to six months from the schedule for work. Weather delays can force deviations from the schedule at any time. District must continue to maintain the rest of its system which could cause delays in the schedule.
<b>B.4</b>	Pipe sizing, turnout locations, construction methods are created by the District Superintendent using Manufactures design criteria. If the grant is approved, designs will be reviewed by an Engineer. The District has also completed preliminary design on other

	lateral projects using the same basic material which can be substituted if necessary.
<b>B.5</b>	The district uses a 30% loss factor for seepage and evaporation and 10% operational spills factor for laterals. The district delivery efficiency will normally run in the 55 to 60% range. We are conservatively estimating 2 acre feet per mile per day of operations on these laterals. Calculating in operational spills and savings from metered turnouts, 2,000 af./yr. will be saved by these pipelines.
<b>C.</b>	<b>Description of Estimated Project Benefits and Improved Delivery Efficiency</b>
<b>C.1</b>	The annual water supply is 100,000 af in normal years.
<b>C.2</b>	The District delivers 1.25 af (15")/acre to its irrigator's fields. The average use from crop census compiled from 1958 to 2002 shows 14.6" as the average use in the District. See Information from Crop Census in Appendix.
<b>C.3</b>	Long terms records from the Bureau of Reclamation field Office McCook Ne. and the District's efficiency records in this office, reveal the Districts delivery percentages at 55 to 60%. This leaves 40% for the above losses. Multiplying the 100,000 af X 40% = 40,000 af of losses/yr.
<b>C.4</b>	<i>Assuming we reach a full supply, 38,000 af, savings of 2,000 af</i>
<b>C.5</b>	2,000 af direct project benefits  2,000 af X 40 years = 80,000 af based on estimated 40 year life of pipeline during irrigation season. Water saved during irrigation season benefit supplies and other user's year – round.  Bureau of Reclamation and District historic records on the project.
<b>C.6</b>	Irrigators are converting from gravity to pivot irrigation at a rapid pace. Burying these laterals could allow an additional 10 – 15 pivots to be installed thus reducing the water usage on those partials by nearly 50%. Water saving will also be accomplished by installation of metered turnouts. All water savings will benefit either carry over storage or increased length of recreational activities in the reservoirs. All benefits will begin upon completion of the laterals.  If 2,560 acres are involved and 50% convert to pivot irrigation, savings of 1600af will be realized (2,560 x 1.25 (15") = 3,200 x 50% savings = 1,600).  Pivot efficiencies Lenny Duberstien Bureau of Reclamation, KSU pivot efficiency, Kansas Bostwick comparison records.
<b>D</b>	<b>Quantifying Actual Post-Project Benefits</b>
<b>D.1</b>	Comparisons from past years records. Efficiency of each ditch riders area are kept on an annual basis. Improved efficiency in less loss and evaporation will be noted. Where pivot irrigation is installed, reduced total usage will also be recognized.
<b>E.</b>	<b>Potential Environmental Impacts</b>
<b>E.1</b>	Work is in rural area with minimal effect on air or water quantity or quality. Abundant animal habitat adjoins the area.

<b>E.2</b>	None were identified in contract renewal EIS
<b>E.3</b>	None known of
<b>E.4</b>	1950's and completed in 1968
<b>E.5</b>	No effect
<b>E.6</b>	None to our knowledge
<b>E.7</b>	No
<b>F.</b>	<b>Required Permits or Approvals</b>
<b>F.1</b>	Reclamation will conduct cultural research before project begins, all utilities will be notified through Kansas Dig Safe or by direct contact.
<b>G.</b>	<b>Environmental Compliance Costs</b>
<b>G.1</b>	2% is included in budget

<b>Part III – Funding Plan</b>	
<b>A.</b>	The District will fund it's portion through in kind contributions paid for through general O&M funds assessed to the irrigators and through Conservation Reserve Funds held by the District in the amount of \$288,000.
<b>B.</b>	Once grant funds are assured, the District will begin preparation work to bury the pipelines as soon as irrigation season is over. This in-kind work should be included. Also, any engineering cost incurred ahead of start date would be included.
<b>C.</b>	Irrigators involved will contribute towards the districts share as negotiated with the District once the Grant is approved. If this is not accomplished, the District would chose to substitute another project of similar nature with willing contributors. Once irrigators agree to a share, those amounts may be identified. However, their contributions will be paid to the District and considered part of the District share. Therefore, no letters of commitment are included.
<b>D.</b>	Funding of \$300,000 is required to accomplish all 7 laterals. If lesser funding is provided, Laterals will be cut from the list proportionally. Under any circumstance, the District will contribute more than 50% of the total cost.
<b>E.</b>	None
<b>F.</b>	None

## BUDGET

Material: 49,400' PIP pvc (21", 18", 15", 12", 10") fittings, valves, meters, etc	\$689,577
Design, Labor, and Equipment	\$344,791
Subtotal	\$1,034,368
Unlisted Items 8%	\$82,749
Subtotal 2	\$1,117,117
Environmental Contingent 2%	\$22,342
<b>Total Project Cost</b>	<b>\$1,139,459</b>

## BUDGET NARRATIVE

Kansas Bostwick has buried laterals with its equipment and crew for many years. The type of employees need to accomplish the three task identified include but are not limited to operators for dozers, patrols, trencher, excavators, loaders, dump trucks, and laborers. All equipment operators have no less than 5 years experience in this type work. One laborer is a new employee the others have been with the district several years and have helped install many pipelines. Salaries and benefits are explained in the Appendix spread sheet titled Personnel, Wages, & Benefits. Salary increases consisting of cost of living increases will be expected the next three years. These have been ranging from 2-4%.

See spreadsheet Personnel, Wages, & Benefits in Appendix. Benefits include Medicare and FICA deductions, the District provides and pays a portion of medical insurance (Blue Cross – Blue Shield) and employees participate in Kansas Public Employees Retirement System.

Travel to and from jobsite from the District headquarters in Courtland is included in District vehicles at present district rate \$.30/mi. This rate may be adjusted by Board action to reflect current conditions.

The District currently owns all the equipment needed. Dozers and patrols will be needed to prepare the pathway for the pipeline and to finish the area when completed. Excavators will be needed to remove structures, which will be hauled in Dump trucks. Excavators will also be used excavate areas to install turnouts etc where trenching is not practical. Trenching will be completed with the Districts Hydramaxx trencher, which was purchased in 1999 for this type of work. The District has hourly rates on all its equipment, see Custom Rates in Appendix.

The material will consist of 80 psi PIP pipe with sizes varying from 21", 18", 15", 12", and 10" the current prices used in this estimate range from \$17.91, 12.86, 8.64, 5.28, and 3.67 /ft respectively. All turnouts will be installed with underground valves with wheel operators. These valves open slow preventing water hammer. Elbows, tees, and other plastic fittings will be 80 psi pvc compatible to PIP pipe. Meters will be McCrometer Meters and will be installed in meter tubes to meet Kansas Department of Agriculture Division of Water Resource specifications. All pipelines will be screened from the canal, which they are installed in using 24" diameter aeration screens.

A 2% environmental contingent was used.

An additional 8% contingent was used for cost increases and unforeseen circumstances. If increases are larger, the project will either be shortened or the District will cover the overages from normal O&M charges. Under no circumstance will the District contribute less than 50% of the total project with more than 70% likely.

## APPENDIX

Map of Project

Letter of Support

Lateral Project Description

Project Material

Information from Crop Census

Savings Conservation Funds

Equipment Rates

Personnel Wages & Benefits