Hidalgo County Irrigation District No. 1, Texas
Canal Lining and Pipeline Installation Project

General Criteria

1. Project Type

The proposed project falls under the Border Environment Cooperation Commission (BECC) priority area of water conservation. The purpose of the project is to provide Hidalgo County Irrigation District No. 1 (HCID No. 1) with improvements to its distribution system to minimize water loss as well as improve the conveyance efficiency of the system thereby conserving water and energy.

2. Project Location

The project is located in Hidalgo County, Texas near Edinburg in southeast Texas. The proposed project is approximately 20 miles from the United States Mexico Border and thus falls within the BECC required 62-mile (100 kilometer) limit.

3. Project Description and Work Tasks

The Project Sponsor is the HCID No. 1, which is a public entity governed by Chapters 49 and 58 of the Texas Water Code, and its ruling body is a Board consisting of user representatives.

The HCID No. 1 diverts 100% of the water used in the district from the Rio Grande River. The water that is used is released from the Falcon Reservoir. The HCID No.1 holds from the Texas Commission of Environmental Quality (TCEQ) a Certificate of Adjudication that authorizes them to divert up to 85,865 acre-feet for irrigation and 1,220 acre-feet for municipal purposes, and also diverts water for Santa Cruz ID No. 15 and Hidalgo County Irrigation District No. 13 and has the responsibility for their adjudication of 77,180 acre-feet and 4,856.85 acre-feet respectively. The HCID No. 1 is served by a series of drain ditches that connect to the Hidalgo County Master Drainage System (HCMDS). Drainage includes surface drainage (from rainfall), subsurface drainage from fields, and canal spillage. The HCMDS transports drainage water from the North part (a dividing line that is roughly defined by US 83) of Hidalgo County to the Laguna Madre, the bay east of Raymondville, Texas.

The HCID No. 1 is proposing to replace existing dilapidated concrete lined canals with rubber gasketed jointed reinforced concrete pipe. The project is phased into two projects: 1) North Branch-East Main Project, and 2) the Curry Main Project. These two projects are a continuation of previous improvements to the East Main and Curry Main system that began in the 1980's.

The proposed project may provide a more efficient means of water delivery thus increasing the availability of the water and sustainability for irrigation and municipal use. This water conservation has the potential to partially offset water shortages within the district during periods of drought. This increase in availability of water could also reduce the risk of diseases associated with the lack of water for municipal or irrigation use. In addition, the change in conveyance method from canal to pipeline may also reduce the hazard of drowning, and other public health issues relative to vector control.

The North Branch-East Main Canals are located on the East Perimeter of the City of Edinburg, Texas. This system of canals provides irrigation water for 3,783 acres east of Edinburg. The proposed project is the replacement of the concrete lined canal system with 26,000 feet of rubber gasketed reinforced concrete pipe ranging in diameters from 48-inch to 60-inch.

The North Branch-East Branch Main System is a concrete lined canal approximately 75 years old. The system consists of 4 feet and 6 feet wide canals roughly 4 feet deep. The existing lining is in extremely poor condition due to the age of the canals. The canals generally follow the topography of the area and include several "drops", which causes a significant loss of useable pressure head that is utilized to serve the HCID No. 1's irrigation customers. It is estimated that due to the irregular grading and the deterioration of the system the system only delivers 50% of the required irrigation capacity.

The East Main Project is located on the east perimeter of the City. A segment of the East Main parallels Curry Road and is locally called "the Curry Main". This segment serves 7,500 acres east of Edinburg. The proposed project is a replacement of approximately 5,000 feet of canal on the Curry Main with 72-inch diameter rubber gasketed reinforced concrete pipe.

The Curry Main is a concrete lined canal constructed in the 1920's when the HCID No. 1 was initially formed. The canal is approximately 8 feet wide and 6 feet in depth with a circular bottom configuration. The existing lining is in extremely poor condition due to the deterioration of the concrete over the last 80 years and as a result has suffered several breaks. Maintenance has been an on-going problem due to the lining breaks caused by the seepage that compounds the soil swell-shrink cycles. Due to these conditions, the canal loses a significant amount of water due to seepage, and the hydraulic efficiency of the canal is extremely impaired due to the breaks and the deterioration of the canal.

The work tasks were developed based upon the Project Plans and Environmental Information Summaries for the North Branch-East Main Project and the Curry Main Project that were prepared in September of 2002 by Melden & Hunt, Inc. Each respective project plan includes a brief description of the project and alternative analysis that evaluated four different alternatives. It was recommended that the canal system be replaced with a rubber gasketed reinforced concrete pipeline system. The immediate net benefits of the alternative are:

- *Virtual elimination of water lost due to leakage and evaporation*
- *Reduced maintenance*
- *On-farm savings result by eliminating hydraulic drops in the systems hydraulic profile.*

The Program of project work tasks are based upon the work being accomplished in two phases:

- *North Branch – East Main Project*
- *Curry Main Project*

The HCID No. 1 commenced design through its engineering consultant (Melden & Hunt, Inc.) on the project and it was completed in December 2002. The HCID No. 1 has received funds for planning and designs from the State Energy Conservation Office (SECO) through the Texas Water Development Board (TWDB). The technical documents have been prepared and the design of the project has been approved by the USBOR.

The proposed cost breakdown by project is as follows:

Project	*Construction Cost*	*Administrative & Engineering*	*Total Project Costs*
North Branch – East Main	*$3,980,990*	*$326,624*	*$4,307,614*
Curry Main	*$1,264,298*	*$203, 088*	*$1,467,386*
Total Project Costs	*$5,245,288*	*$529,712*	*$5,775,000*

4. Conformance with International Treaties and Agreements

The International Boundary and Water Commission (IBWC) is an independent bi-national public organization that foresees that the 1944 Water Treaty between the United States and Mexico related to water and boundaries issues applies. The project will not violate the allocation of water rights. The District will continue to meet all state surface water diversions from the Rio Grande in accordance with the agreements in place and the restrictions of the Treaty.

Human Health and Environment

1. Human Health and Environmental Need

The human health impacts from this project would be all positive from the sense that through water conservation, additional water could be made available for growing crops for human consumption and additional water could be available for municipal use. This water conservation could partially offset water shortages during periods of drought. Through water conservation and a more efficient use of the allocated waters for irrigation and municipal use, a growing population of the region can be sustained over a longer period without creating health risks through diseases due to unsanitary conditions because of lack of water.

The Rio Grande Valley has in the past 7 years experienced a drought, which has limited the amount of surface water available for irrigation and municipal use. The drought in northern Mexico and the entire Rio Grande Basin, which includes the Rio Conchos Basin in northern Mexico, has contributed significantly to the water shortages for irrigation in the Lower Rio Grande Valley. This water shortage has created an economic hardship in the region through reduction of crops and subsequent reduced revenue. The proposed water conservation project may potentially eliminate water seepage losses with resulting water savings.

2. Environmental Assessment

Environmental Information Summary reports were prepared by Melden and Hunt, Inc., and are titled "Hidalgo County Irrigation District No. 1 North Branch/ East Main Project, September 20, 2002", "Hidalgo County Irrigation District No. 1 Curry Main Project, September 23, 2002".

Construction of the proposed water conservation measures through installing a closed conduit (pipeline) system could have a direct impact through conserving water and thus making it more available for irrigation of crops for human consumption and use and making more water available for municipal use and sustaining an existing and growing population. In additional, the change in conveyance method from canal to pipeline may also reduce the risk of drowning, and other public safety and health issues relative to vector control. Through construction of the water conservation project, an indirect effect may be employment in an area with a high unemployment rate.

The overall cumulative effect may be positive. From an environmental aspect, the project may not pose any environmental hardships or have any negative effects on the project area. From a standpoint of soils, vegetation impacts, endangered and/or threatened species, disruption to wildlife habitat, wetlands and waterways, land use, farmlands, historical-cultural resources, air quality and acoustic impacts, hazardous materials, traffic hazards and disruptions, clearing, grubbing, and spoil disposal, and obstruction of views, the project may have a minimal to negligible effect with an overall positive result. In summary the project may have a positive impact from environmental, cultural, and economic perspective.

No negative or unavoidable impacts as a result of this project are anticipated or have been identified.

Environmental benefits have been discussed under Direct, Indirect and Cumulative effects. No environmental risks or associated costs are anticipated in the project area.

3. Compliance with Applicable Environmental and Cultural Resource Laws and Regulations

As part of the preparation of the Environment Summary Report, preparation utilized information from TCEQ, United States Census Bureau, United States Fish and Wildlife Service, the Texas Parks and Wildlife Department, USBOR, the National Park Service, the Texas Historical Commission, the National Weather Service, the U.S. Soil Conservation Service, the Texas Department of Transportation, the TWDB, and the U.S. Army Corps of Engineers (COE).

A review of the Environmental Information Summary reports prepared for the North Branch/East Main Project and the Curry Main project has also been requested in correspondence (September 18, 2002) to the following cooperating agencies:

- *TCEQ*
- *United States Fish and Wildlife Service*
- *Texas Parks and Wildlife Department*
- *Texas Historical Commission*
- *U.S. Soil Conservation Service and*
- *U.S. Army Corps of Engineers (COE)*

Technical Feasibility

1. Appropriate Technology

The reinforced concrete pipe planned for the project will meet ASTM Specification C-76 and/or C-361, and the U.S. Department of Interior, USBOR specification for the R-4 rubber gasket joint. The pipe for this project will meet the A-50 USBOR specification.

All design and construction requirements are to adhere to USBOR requirements under the "Guidelines for Preparing and Reviewing Proposals for Water Conservation and Improvement Projects under Public Law 106-576" as per the memorandum of agreement

between the HCID No. 1 and the USBOR. The Engineer will use the USBOR engineering criteria for all hydraulic calculations.

A discussion of the most effective technology utilized and the methodology used in the evaluation of the alternatives and selection of the recommended plan is presented in the Project Plans (Amended) for each phase. The USBOR has approved the Project Plan for the North Branch-East Main Project and the Curry Main Project.

A water savings economic analysis has conducted by the Texas Water Institute, Texas A&M University (TAMU) for this proposed project. According to the Economic and Conservation Evaluation of Capital Renovation Projects for the HCID No. 1, prepared by the Texas Water Resources Institute of the Texas A&M University, the implementation of the two components of the project will allow estimated water savings of 4,625 acre-feet/year, on an average annual basis. The expected water savings from the two components of the project over their expected productive lives are 99,358 acre-feet.

The energy savings estimated by the Texas Water Resources Institute with the implementation of the two components of the project are 885,675 Kw-hr/year, on an average annual basis. The expected energy savings from the two components of the project over their expected productive lives are 19,026,226 Kw-hr. Energy savings are based on reduced diversions at the Rio Grande River.

The HCID No. 1's global efficiency for water delivered for irrigation has been estimated by the HCID No.1 to be approximately 75 to 80 percent. The on-farm field distribution and application efficiencies vary depending on the crop type, land slope, soil type, method of irrigation application, irrigation practice, flow rate of delivered water as well as many other factors. The HCID No. 1's estimated average ratio of quantity of crop consumption use to irrigation water delivered ranges from 60 to 80 percent.

2. Operation and Maintenance Plan

The project sponsor and their consulting engineer have indicated the proposed projects do not require long term O&M plans for the proposed improvements, training or certification of operators, and preparation of an O&M manual. The project is replacing an open canal with a closed conduit conveyance system thereby reducing O&M in comparison to the existing canal system.

No start-up operational plan is required for these projects. Start-up and operational plans may be in conformance with the recommendations of the manufacturers of the equipment supplied in accordance with the project bid specifications.
Any emergencies or contingencies that may occur during the course of the proposed project shall have none or very limited impact on the ongoing operations of the delivery of raw water by HCID No. 1. No contingency plan is required for the proposed project.

The bid specifications shall specify the standards and submittals required by all vendors and contractors for the proposed projects.

3. Compliance with Applicable Design Regulations and Standards

The Project will comply with the design standards of the USBOR and regulations of the Texas Water Development Board (TWDB).

Financial Feasibility and Project Management

1. Financial Feasibility

The financial information concerning the project, Hidalgo County Irrigation District #1, and the District's financial condition to obtain sufficient support of the District's capability to sustain the proposed funding structure of the project and the on-going operation and maintenance of the improvements, were analyzed by a consultant and the recommendation was that HCID No. 1 has the capability to undertake the proposed project.

The project costs are as follows:

Cost of the Project for the North Branch – East Main and Curry Main Improvements

	Funding Source	*North Branch-East Main*	*Curry Main*	*TOTAL*
Administrative & Eng.	*SECO/HCID#1*	*$ 326,624*	*$ 203,088*	*$ 529,712*
Construction	*WCIF/HCID#1*	*$ 3,980,990*	*$ 1,264,298*	*$ 5,245,288*
TOTAL		*$4,307,614*	*$1,467,386*	*$ 5,775,000*

Cost in Dollars. June 2003

The funding sources for the project are summarized in the table below. Based on the WCIF Guidelines, the WCIF grant may support 50% of the project costs up to a maximum of $4,000,000. The funding sources for the project are as follows:

Financial Structure for the Project

Source	*Type*	*Amount USD*	*% of Phase Project Cost*
NADB	*WCIF- Grant*	*$ 2,887,500*	*50.0%*
State of Texas	*SECO Grant*	*$ 350,012*	*6.0%*
HCID#1	*Cash*	*$ 650,000*	*11.0%*
HCID#1	*Short-Term Note**	*$ 732,488*	*13.0%*
HCID#1	*In-Kind*	*$1,155,000*	*20.0%*
TOTAL		*$ 5,775,000*	*100.0%*

**The short-term note is supported by a three-year repayment plan of $224,163/year.*

The District will provide construction services as an in-kind contribution to the project including labor, heavy equipment and related tasks.

The BECC requested a third party review of the capability of the District for supporting the initial investment and the sustainability of operations and maintenance for the project. BECC's financial consultant, Estrada Hinojosa & Company, Inc., rendered an opinion concluding that the District does provide this capability without an adjustment to the current Fee and Assessment Structure.

The District has developed the project in accordance with requirements for funding participation by the United States Bureau of Reclamation (USBOR). The District has submitted the project for consideration by USBOR. Should the USBOR funding become available, the District will request reimbursement for approved cash expenditures.

2. Rate Model

The rate model for this type of Project Sponsor is better described as a Fee and Assessment Structure. The District charges an annual $18.00 per acre flat rate assessment. This assessment supports the operation and maintenance of the District. In addition, the District charges a delivery fee of $9.00 per acre per irrigation.

The table below summarizes the existing structure.

Existing Assessment Fee Structure

Fees	*Interval*	*Charge per Acre*
Flat Rate Assessment	*Per Year*	*$ 18.00*
Delivery Charge	*Per Irrigation*	*$ 9.00*

The District also earns revenues from delivery of water to municipalities at a rate of $0.1268 per 1000 gallons as well as for the delivery of water to other irrigation districts.

The fee structure for Hidalgo County Irrigation District #1 has not been adjusted during the historic five-year period. The proposed project and funding source structure does not require an adjustment to the current Fee and Assessment Structure implemented by the District.

3. Project Management

The project will be managed by Hidalgo County Irrigation District #1. The District has managed the construction of similar projects throughout the District's properties. District personnel are specifically skilled in the operation of heavy equipment. Additionally, the District has unique experience working with different lining technologies.

The District will operate in a self-sufficient manner, supporting itself through user fees. The project will not require additional staffing. Therefore, the existing organizational structure, which has been provided, will be sufficient.

Community Participation

1. Comprehensive Community Participation Plan

BECC certification requires a public participation process to promote community understanding of and support for the proposed project is required. The Public Participation Plan (Plan) was developed per certification requirements and was designed to provide a framework for the sponsor and steering committee to conduct public participation in the areas served by HCID No. 1. The Plan was submitted and approved on September 2002.

Local Steering Committee

The steering committee was made up of Willard Fike and R. L. "Bobby" Bell Jr. of the Hidalgo Irrigation District Board; Charles Browning of the North Alamo Water Supply Corporation; Ernesto Alaniz, of the City of Edinburg; and Tommy Garcia a local landowner, farmer and citrus grower. Assisting the committee on the Technical Work Group were George Carpenter, general Manager, and Estella Garza, Tax Assessor/Collector of the Irrigation District and the consulting engineers Larry Smith, P.E., Fred Perez and Carlos Garza of Melden and Hunt, Inc.

Meeting with Local Organizations
Per BECC requirements, local organizations were presented with the project proposal and other pertinent project information. The steering committee made presentations to the Board of Directors of Santa Cruz Irrigation District #15, North Alamo Water Supply Corporation, and to the City Council of the City of Edinburg to request their support for the project. Resolutions in support of the project were passed by the respective boards and letters were received from each one acknowledging their action.

Public Access to Project Information
The Project Plan and Environmental Information Summary were made available for public viewing thirty days prior to the first BECC public meeting. The documents were available for viewing during normal business hours at the old and new District offices, as well as the Edinburg City hall. For after hours the documents were available by contacting the District for an appointment. In addition, notices of availability of project information were included in public meeting notice that was published in Edinburg Daily Review 30-days prior to the first public meeting, distributed with water tickets at time of purchase, mailed to owners of assessed property.

The Jim Hearn Farm Program, of the KURV radio station in Edinburg provided interview airtime with District members to talk about the project. The program has a foot print coverage from Brownsville to Rio Grande City.

The Edinburg Daily Review newspaper ran headline, front page news articles about support for the project on two different days. The McAllen Monitor newspaper also ran an article about the proposed water conservation project.

Fact sheets were developed that include basic information on the project such as maps, technical, environmental, financial and public participation components. The fact sheets were utilized by the steering committee for community outreach. Copies of the fact sheets were available at the District's office, distributed with water tickets at time of purchase, and delivered by mail to district landowners.

Public Meetings
The first BECC public meeting held was a general information meeting to provide the public with an update of the proposed water conservation improvements. The meeting was held Thursday, October 24, 2002 to present the technical aspects of the project. The second BECC public meeting was held on May 22, 2003, and was focused on the financial aspects of the project, such as NADB financial analysis and impact to the District. Survey questions were distributed to landowners to receive public input asking to indicate their level of support for the project including the Financial Plan

2. Report Documenting Public Support
The final Comprehensive Public Participation Report was delivered to the BECC.

Sustainable Development

1. Definition and Principles
The project complies with BECC's definition of Sustainable Development: "Conservation oriented social and economic development that emphasizes the protection and sustainable use of resources, while addressing both current and future needs, and present and future

impacts of human actions." *This project may positively impact the area and sustainable life of the area's residents through the conservation of water which is becoming a scarce resource and critical for sustainability of life and economic growth. Through elimination of water loss through seepage and reduction of energy needs by closely monitoring water distribution times and quantities of flow, the project provides a positive impact on the overall environment by conserving and effectively using a limited water supply resource. Local residents may benefit from better agricultural yields and from a better quality of life within mature water resources conservation scheme, being careful not to compromise water and soil resources for the future, considering that modernization and technical improvements within the District's operational system provide a net positive effect.*

The required public review process ensures that residents in the project's influence area participate in the development process fully aware that the decisions they make may focus on the sustainable management of environmental resources to achieve a better environmental and socio-economic improvement in their community.

2. Institutional and Human Capacity Building

The Rio Grande Regional Water Plan, in support for the implementation of agricultural water conservation strategies, includes the following strategies for reducing irrigation shortages:

- *Expanded technical assistance should be available from local, state, and federal sources to assist irrigation districts with more detailed, systematic evaluations of district facilities and management policies to identify cost effective water efficiency improvements.*
- *The State of Texas and the federal government should assist with the financing of irrigation water efficiency improvements through the provision of low interest loans and /grants.*

Accordingly, due to the limited financial capacity of irrigation districts, the State of Texas through the State Energy Conservation Office (SECO) and TWDB provided financial assistance to the HCID No.1 for the preparation of feasibility studies, and the necessary documentation that was required to support federal appropriations of construction funds. Also, the Texas Water Resources Institute of the Texas A&M University prepared the Economic and Conservation Evaluation of Capital Renovation Projects for the HCID No.1, with funds provided through a federal initiative, "*Rio Grande Basin Initiative*", *administered by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture.*

The NADB Water Conservation Investment Fund will complement with grant funds the capital investments that will be spent in the Irrigation District improvements. The use of these grant funds allows the Irrigation District to improve its infrastructure in order to reduce water losses in water conveyance.

The HCID No. 1 maintains a competent staff of 6 personnel in administration and management, and 26 in operation and maintenance. There are no State licensure requirements for personnel. However, the District hires trained personnel for the various functions required for operation and maintenance. Typical job requirements are pump and engine maintenance, vehicle mechanics, welders, and equipment operators. The District also operates a training program for its employees. The Curry Main and North Branch-East Main projects may reduce the O&M budget by approximately $83,200 per year. The proposed project may not require the additional personnel, increase operating costs, or require additional training to facilitate the inclusion of the proposed project into its infrastructure.

3. Conformance with Local and Regional Conservation and Development Plans

The HCID No. 1 adopted a Water Conservation Plan on July 15, 1999 and a Drought Contingency Plan on July 29, 1999. These plans were submitted to the Region "M" Water Planning Group. The plans were prepared in accordance with Title 30, of the Texas Administrative Code (TAC), Chapter 288 of the Water Code. The project conforms to the Rio Grande Regional Water Plan, which recommends agricultural water conservation and on-farm water use efficiency, in order to reduce irrigation shortages.

4. Natural Resources Conservation

The proposed project was developed with the intent of conserving water. The HCID No. 1 provides water to approximately 20,000 acres of agriculture cropland within its District and diverts up to 10,409 acre feet (ac-ft) for residential and commercial water users in the city of Edinburg and those areas serviced by the North Alamo Water Supply and Sharyland Water Supply Corporations. Additionally, the District provides up to 42,253 acre-ft to Santa Cruz Irrigation District #15. Recent agricultural water use has ranged from 53,792 to 67,661 ac-ft with an average of 61,804 acre-ft. Municipal and industrial water use has been more consistent, ranging from 8,741 to 10,466 acre-ft with the average at 9,515 ac-ft.

According to the Economic and Conservation Evaluation of Capital Renovation Projects for the HCID No. 1, prepared by the Texas Water Resources Institute of the Texas A&M University, the implementation of the two components of the project will allow estimated water savings of 4,625 acre-feet/year, on an average annual basis, as shown in the table below.

Item	*Description*	*Annual Water Savings (Acre-feet)*	*Annual Energy Savings (Kw-hr)*
72" Pipeline replacing Delivery Canal (Curry)	*Replacement of 5,000 feet of canal with 72" diameter rubber gasketed reinforced concrete pipe*	*1,366*	*193,753*
Multi-Size Pipeline replacing Delivery Canal (N. Branch/ E. Main)	*Replacement of 26,000 feet concrete lined canal with rubber gasketed reinforced concrete pipe ranging in diameter from 48" to 60"*	*3,259*	*691,922*
Total Annual Savings		*4,625*	*885,675*

The expected water savings from the two components of the project over their expected productive lives are 99,358 acre-feet.

The energy savings estimated by the Texas Water Resources Institute with the implementation of the two components of the project are 885,675 Kw-hr/year, on an average annual basis.The expected energy savings from the two components of the project over their expected productive lives are 19,026,226 Kw-hr.

Improving the efficiency by minimizing water lost through seepage and evaporation may save significant amounts of water and energy and may make available a greater amount of

water for a more efficient use of this natural resource in irrigation for the production of crops as well as municipal and industrial responsible usage.

5. Community Development

The benefit obtained by the modernization of these irrigation facilities by the proposed projects may directly impact agricultural production and may result in an increased income and an improved quality of life for the end users. With this, the increased economic may be enhanced by making residents active participants in their community's development.

An improved quality of life for the residents may also have a favorable impact on the development of health, and education of the area.

List of available documents

Documents available related to the Hidalgo County Irrigation District No. 1, Texas, Canal Lining and Pipeline Installation Project:

- *Baseline Conditions and Irrigation District Indicators for the Hidalgo County Irrigation District No. 1, Texas*
- *Environmental Summary*
- *Economic and Conservation Evaluation of Capital Renovation Projects: Edinburg Irrigation District Hidalgo County No. 1, Texas, 72" Pipeline Replacing Delivery Canal and Multi-Size Pipeline Replacing Delivery Canal prepared by Texas A&M University*
- *Financial Analysis*
- *Certification Document*
- *Project Plan*