NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: Frenchman Cambridge Storage Enhancement and Retiming Project, Phase 2 (Cambridge Canal, Oxford to Alma)

PRIMARY CONTACT INFORMATION

Entity Name: Frenchman Cambridge Irrigation District

Contact Name: Bradley Edgerton

Address: 1310 West Highway 6 & 34, P.O. Box 116, Cambridge Nebraska 69022

Phone: (308)737-6221 Cell (308)-697-4535 Office

Email: bradley.edgerton@gmail.com

Partners / Co-sponsors, if any: None

1. Dollar amounts requested: (Grant, Loan, or Combination)

   Grant amount requested. $ $528,643.00

   Loan amount requested. $ 0

   If Loan, how many years repayment period? N/A

   If Loan, supply a complete year-by-year repayment schedule.
   N/A

   Are you requesting less than 60% cost share from the fund?
   No
   If so what % ? 60%

2. Permits Needed - Attach copy for each obtained (N/A = not applicable)

Nebraska Game & Parks Commission (G&P) consultation on Threatened and Endangered Species and their Habitat	N/A☒	Obtained: YES☐	NO☐
Surface Water Right	N/A☒	Obtained: YES☐	NO☐
USACE (e.g., 404 Permit)	N/A☒	Obtained: YES☐	NO☐
Cultural Resources Evaluation	N/A☒	Obtained: YES☐	NO☐
Other (provide explanation below)	N/A☒	Obtained: YES☐	NO☐

Click here to enter text.

3. Are you applying for funding for a combined sewer over-flow project?

YES☐ NO☒

If yes, do you have a Long Term Control Plan that is currently approved by the Nebraska Department of Environmental Quality?

YES☐ NO☐

If yes attach a copy to your application. N/A

If yes what is the population served by your project? N/A

If yes provide a demonstration of need. N/A

If yes and you were approved for funding in the most recent funding cycle, then resubmit the above information updated annually but you need not complete the remainder of the application.

4. If you are or are representing an NRD, do you have an Integrated Management Plan in place, or have you initiated one?

N/A☒ YES☐ NO☐

5. Has this application previously been submitted for funding assistance from the Water Sustainability Fund and not been funded?

YES☐ NO☒

If yes, have any changes been made to the application in comparison to the previously submitted application? N/A

If yes, describe the changes that have been made since the last application. N/A

No, I certify the application is a true and exact copy of the previously submitted and scored application. (Signature required) N/A

Section B.

DNR DIRECTOR'S FINDINGS

Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?

YES☒ NO☐

1(a). If yes (structural), submit a feasibility report (to comply with Title 261, CH 2) including engineering and technical data and the following information:

A discussion of the plan of development (004.01 A);
This project involves the installation of precise flow measurement and control gates along the lower third of the Cambridge Canal to precisely match supplied flows to real-time demand and reduce operational spill by approximately 1,400 ac-ft per year, saving this water in storage for beneficial use. A previous WSF funded project has automated the upstream sections of the Cambridge canal and has demonstrated water savings better than 2,800 ac-ft per year; this proposed extension project will leverage and build upon these savings to bring total recovered spill on the Cambridge canal to approximately 4,200 ac-ft per year. The attached Rubicon Scoping Study document is the feasibility report for this project. It documents the flow measurement and control hardware and processes that are proposed to be installed. Control and measurement gates are integrated into a radio telemetry network which provides real-time field measurement of water levels and flows along the length of the canal. A central computer utilizes this information to continually update real-time flow setpoints for each check structure along the length of the canal so that the supplied flows precisely match the downstream demand, and unintended operational spill is eliminated. The gates and supporting telemetry and control system will be installed in a one-year program, meaning that the resultant water savings will be realized on an ongoing basis beginning one year after program commencement.

A description of all field investigations made to substantiate the feasibility report (004.01 B); A canal system inspection has been performed to assess the condition of all regulating structures and to confirm the work required to make each structure good and to install the flow measurement and control equipment described in this proposal. This inspection has confirmed the existing location and condition of regulating structure assets against the original as-constructed plans. The Irrigation District has also worked with the equipment supplier to confirm the type and model of measurement and regulating equipment that will achieve the intended outcomes at the lowest whole of life cost.

Maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C); These supporting documents are contained in the Rubicon Scoping Study which is provided as an attachment to this application. The feasibility report is based upon a site inspection and the as-built plans for the canal as provided by the BOR engineering and construction records.

A description of any necessary water and land rights and pertinent water supply and water quality information, if appropriate (004.01 D); Frenchman-Cambridge Irrigation District (FCID) utilizes the storage supply from three Federal Reservoirs via Reclamation repayment contract no. 009D6B0122. Reclamation constructed the Canals, Drains and Laterals for this Irrigation Project, and FCID has a repayment obligation for the Project. Reclamation owns all the lands associated with the project and holds the Storage permits for the Reservoirs and the Storage Use permits on all the project acres (45,669 acres). FCID holds the natural flow permits for the same 45,669 acres. Within its repayment contract FCID maintains the Irrigation project and funds a percent of the O&M associated with the three Reservoirs. FCID has adopted a "District Operating Plan" that is approved by Reclamation and the Plan is an appendix to the repayment contract. Within this plan FCID has adopted Water Conservation Measures. In the early 1980s FCID took out a loan for 5.5 million dollars and under the R&B program, converted all 110 miles of open ditch laterals to buried PVC pipe. The District recently completed canal automation works which were supported by a 2016 Water Sustainability Fund application and Reclamation WaterSMART grants in 2014; these have proven to be a valuable infrastructure upgrade with proven water use efficiency results. The extension of this project will further benefit the Republican River Basin, and so further installation of Total Channel Control (TCC) is a key component in the scope of FCID's District Operating Plan.

A discussion of each component of the final plan including, when applicable (004.01 E);

Required geologic investigation (004.01 E 1); No geologic investigation is required to undertake this project. However, the project will provide more useful geologic information for future use. This project will use precise flow measurement at each check structure within the canal to assess the recharge rate at each pool within the canal network and thereby quantify the recharge rates of the underlying geology. A better understanding of the recharge rates will also help the Republican River Compact Administration (RRCA) investigate the beneficial consumptive use charged to Nebraska for water consumed by the canal systems. Currently 18% of all canal diversion is assumed to be a consumptive use charged to the state that has Federal Reclamation Projects located. FCID would

cooperate with the RRCA to better understand the total water balance of our canal systems. Accurate measuring of the water as it moves through the canal system would provide some valuable data.

Required hydrologic data (004.01 E 2); The University of Nebraska, local Natural Resources Districts and the Bureau of Reclamation have many observation wells within the Republican River Basin. Reclamation has developed a network of observation wells within the Projects to collect data on canal recharge and groundwater levels. An additional layer of canal flow data along with the annual well readings would provide a good picture of the health of the river and streams of the basin.

Design criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3). The project will be fitting new flow measurement and flow control actuation to existing concrete check structures. These structure upgrades will not modify the structural loading of the upgraded check structures, and so there is no requirement to undertake a structural or foundation assessment on these existing check structures. Where new structures are proposed, these will be designed and constructed in accordance with existing approved plans to match existing check structures with consideration given to local geology and footing construction requirements.

1(b). If no (non-structural), submit data necessary to establish technical feasibility including, but not limited to the following (004.02):

A discussion of the plan of development (004.02 A);
The plan of development is detailed in the accompanying Rubicon Scoping Study.

A description of field or research investigations utilized to substantiate the project conception (004.02 B); Historical canal spill records provide knowledge of the unmanaged return flows presently being returned as unplanned instream flows. Some of these spill volumes are provided by Reclamation's Hydromet System spill summaries for the Cambridge Canal. The average yearly spill from the Cambridge Canal is approximately 4,372 acre-feet per year of unmanaged water losses. Approximately 2,800 acre-feet have been recovered by automating the operation of the top 28-mile section of the Cambridge Canal, and this project to complete the automation of the Cambridge Canal is expected to recover an additional 1,400 ac-ft, to bring the water recovered on the Cambridge Canal up to the majority of the 4,372 that was historically lost. In addition to the recorded spills many spillback structures are un-measured and not recorded, these structures tend to spill water intermittently into a dry tributary to the Republican River and in most cases

the spilled water does not reach the River. This recorded data provides a basis to quantify the volumes of water that could be retained in storage and retimed to return to the stream at times of peak demand and need in August. The saved water could also be utilized to retime Compact augmentation water before it is actually pumped from the ground. This would insure that Nebraska meets all deadlines associated with future Compact resolutions. Many case studies and customer references have been provided in the Rubicon Scoping Study to establish the fact that the proposed Total Channel Control solution eliminates spill and precisely matches supply to demand to reduce the draw-down of stored water and make it available for further beneficial use later in the season. Examples of references with contact details have been provided in Australia, California (Oakdale, Turlock and Solano Irrigation Districts), Washington (Naches Selah Irrigation District), Arizona (PIMA Maricopa Irrigation District) and Nebraska. The proposed solution has been proven in often more than fifteen years of operation in the irrigation districts referenced and has been put through extensive due-diligence assessments conducted by State governments in Australia and irrigation district engineering and operations staff. The experience of these broad implementations over fifteen years is that the Total Channel Control solution eliminates spill and allows that water to be retained in the reservoir to reduce draw down and be made available for managed streamflow retiming.

A description of the necessary water and/or land rights, if applicable (004.02 C); Same as (004.01 D) from above.

A discussion of the anticipated effects, if any, of the project upon the development and/or operation of existing or envisioned structural measures including a brief description of any such measure (004.02 D).

The proposed project will enhance the operation of Swanson, Hugh Butler and Harry Strunk reservoirs by providing real-time demand information which can be used to precisely set discharge release flows to the exact value required to meet downstream demand. This information allows dam operators to operate with a high degree of precision to reduce draw down and release of water which is presently passing through the system at unmanaged times and so is not providing maximal managed benefits.

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative. This solution provides irrigation districts with the most economical means of eliminating operational spill. Alternatives are piping, which typically costs up to ten times more than the proposed method on the larger canal sizes encompassed in this project, or in-line balancing storages which also cost more to construct than the proposed solution. The recharge benefits realized by the proposal cannot be achieved with

piping. Likewise, the storage and recreational use benefits associated with reducing draw down on Swanson, Hugh Butler and Harry Strunk storages cannot be realized with in-line balancing storages, as this water is relocated to new smaller locations which do not readily provide recreational benefit. There are numerous alternative canal automation solutions, but these technologies are limited to either water level or flow control in smaller sub-sections of the canal network – and these approaches do not result in the elimination of spill and the resultant ability to retain this water in storage. This capability is unique to Total Channel Control technology which contains many years of academic research to enable entire canals to be controlled in a coordinated manner to eliminate spill.

3. Document all sources and report all costs and benefit data using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies shall be fifty (50) years or with prior approval of the Director, up to one hundred (100) years [T261 CH 2 (005)].

   - Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01). The engineering and inspection functions have already been performed, and all implementation costs have been priced at $881,071. This price includes any remaining engineering and inspection costs and capital construction costs. The equipment installed in the project is designed with a 30-year economic life and the ongoing maintenance costs are estimated to be less than 2.5% of the up-front capital costs per year. These ongoing maintenance costs are largely offset by reduced vehicular and operations costs. The estimated construction period is 4 months commencing January 2019, and the estimated economic life of the installed equipment is 30 years. The accompanying FCID Project Costings and Economic Value spreadsheet demonstrates the economic value of this project.

   Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe any intangible or secondary benefits separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, such that the economic feasibility of the project can be approved by the Director and the Commission (005.02).

FCID's main interest with this project is to be sustainable with the basin's water supply going forward. The goal of the project is not to increase the inches per acre, the goal is to have the ability each year to plan for next year's irrigation requirements. The ability to plan for the following year's irrigation activities is more valuable than unknown and unpredictable commodity prices. The primary tangible benefits will be a reduction in unmanaged operational spill of water stored in Swanson, Hugh Butler and Harry Strunk Reservoirs, which amounted to 4,300 ac-ft lost as unplanned spill out of the escapes along the length of the Cambridge Canal in the 2015 irrigation season. This water will be recovered and retained in these reservoirs to be retimed for late season releases which will benefit a range of downstream interests including environmental, recreational, agricultural, and potentially interstate parties. This value will accrue each and every year of the 30-year asset life of the project, which will only require 4 months to implement - resulting in these benefits being available in in the irrigation season immediately following the announcement of grant awards. The economics of this project are considered in the accompanying spreadsheet FCID Project Costings and Economic Value. When the up-front capital costs are compared to the benefits over the 30-year economic life of the project, the yearly cost benefit ratio can be determined as $881,071 / (30 x 1400 acre-feet per year) = $21 per acre-foot recovered - which clearly represents a high level of economic feasibility. In addition to this primary benefit, the following secondary benefits are also delivered: 1. Useful geologic information on rate of groundwater recharge to assist in RRCA operations. 2. Downstream users can benefit from the availability of this conserved surface water, which enables managed releases at times of peak demand in August. 3.This saved water can potentially be used to retime Compact augmentation water. 4. Early season enhanced groundwater recharge will enhance aquifer storage and assist in reducing aquifer depletion. 5. Enhanced recreational outcomes at the three reservoirs resulting from an increase in the volume of water retained in these reservoirs. 6. Wildlife benefits for migratory bird species. 7.Reduction in invasive vegetation with improved water quality outcomes

- All benefit and cost data shall be presented in a table form to indicate the annual cash flow for the life of the proposal, not to exceed 100 years (005.03). The project is not primarily intended to generate revenue – FCID's main interest with this project is to be sustainable with the basin's water supply going forward. The project is designed to be implemented in one year so that the full benefits of water savings can be realized in the first year following the winter construction program. Accordingly, the full project budget of $881,071 will be spent within the first year, and the full project benefits will accrue equally over the 30-year economic life of the project. These benefits and costs are documented over the life of the project in the accompanying costings spreadsheet.

- In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, the economic feasibility of such proposal shall be demonstrated by such method as the Director and the Commission deem appropriate (005.04). Storage is often required to maintain water availability in dry years. Basin sustainability is improved by maximizing the availability of stored water. Management of basin sustainability means managing the availability of stored water to meet the needs of users. The precise management of the volume and timing of supply releases improves basin sustainability by ensuring that water is available at the time of need of downstream users and that water does not pass through the system without benefit. This project will enhance water sustainability in the Republican River basin by providing the following benefits: 1. Enhanced groundwater recharge in wet years -water-tight gates can be used to run specific sections of canals deeper for longer and therefore provide targeted incidental recharge, adding water availability to the system. 2. Reduced excess extractions from river, groundwater and surface reservoir storage in dry years - increased surface water availability reduces the need for river diversions and groundwater pumping - thereby reducing aquifer depletion. 3. Improvements in water quality for downstream users and accompanying improvements in river health - water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river. In addition, river flows are increased along the reaches parallel to irrigation districts, with associated environmental benefits. These benefits provide positive impacts to all users in the river basin.

4. Provide evidence that sufficient funds are available to complete the proposal. See attached Treasure's Report for FCID dated June 30, 2018.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).
   See attached 2018 Budget for FCID. Note: income is based on 45669 acres X $4.00 per acre plus $4.00 per acre-inch allocated. The average allocation in 2018 is 6.55 inches per acre for all 45,669 acres. The District's operating budget is sufficient to cover annual operating and maintenance costs.

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.
   No loan is involved.

7. Describe how the plan of development minimizes impacts on the natural environment.

The plan of development will minimize the impact on the natural environment by ensuring the following: 1. Civil construction works will be limited to minimal modification to existing concrete structures and will not require excavation or moving of earth. 2. No chemicals will be released into soils or waterways as a part of these works. 3. The solution is a zero energy solar powered solution which will not create green-house gas emissions and which provides a zero energy zero emission alternative to groundwater pumping. 4. The solution provides wildlife benefits to sustain the environment by increasing instream flows. 5. The regulation of canal flows and water levels remotely via remote telemetry reduces vehicular usage and associated exhaust emissions and road wear and tear. 6.The regulation of canal flows and water levels remotely via remote telemetry provides early warning via SCADA utilizing text messaging and email warnings of high or low flows and or high and low water levels.

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds.

As General Manager and operator of FCID's assets, the governing Board for Frenchman Cambridge Irrigation District and Management is responsible and legally capable of carrying out the project. Our field operations crews have the qualifications, certification and operational experience to undertake the civil works required in this project and have successfully completed and implemented the first phase of the District's plan to automate. All control gate hardware, communications, and software is being installed by Rubicon Water, a specialist company who has more than 20 years' experience installing and commissioning systems as specified in our proposal.

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state.

The Republican River Compact is a State obligation. This plan will help Nebraska ensure compliance with the Compact by reducing the amount of storage water needed to operate Cambridge Canal each year. A high reservoir elevation in Harry Strunk Reservoir at the end of each irrigation season will result in that reservoir filling and spilling water downstream to Harlan County Reservoir much earlier than historically occurred. Harlan County Reservoir is the main source of supply for Kansas Bostwick Irrigation District. With the newly developed Integrated Management Plans (IMP) developed by the State of Nebraska and local Natural Resources Districts (NRD) one management action identified as a tool to help Nebraska achieve compliance is "Surface Water Leases". This concept was successfully implemented in 2007 when Frenchman Cambridge Water users on the Cambridge Canal system agreed to forgo irrigation and allow Reclamation to move Storage water from Harry Strunk Reservoir downstream to Harlan County Reservoir as an offset to groundwater depletions. The water was then available to the Kansas

Bostwick Irrigation District. The water saved with this project could be available via this same marketing mechanism and used as an offset for any of the supporting NRDs. This offset could be in lieu of pumping expensive groundwater from the ground via N-CORPE

10. Are land rights necessary to complete your project?

YES☐ NO☒

If yes, provide a complete listing of all lands involved in the project.
N/A

If yes, attach proof of ownership for each easements, rights-of-way and fee title currently held.
N/A

If yes, provide assurance that you can hold or can acquire title to all lands not currently held.
N/A

11. Identify how you possess all necessary authority to undertake or participate in the project. The governing Board for FCID adopted the enclosed resolutions 2-18 supporting this project.

12. Identify the probable environmental and ecological consequences that may result as the result of the project. There will be no adverse environmental or ecological consequences that may result from the project.

Section C.

NRC SCORING

In the NRC's scoring process, points will be given to each project in ranking the projects, with the total number of points determining the final project ranking list.

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0, 2, 4, or 6 for items 1 through 8; and 0, 1, 2, or 3 for items 9 through 15. Two additional points will be awarded to projects which address issues determined by the NRC to be the result of a federal mandate.

Notes:

- The responses to one criterion *will not* be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.

- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted in parenthesis. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.

- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

1. Remediates or mitigates threats to drinking water;

    - Describe the specific threats to drinking water the project will address.
    - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
    - Provide a history of issues and tried solutions.
    - Provide detail regarding long range impacts if issues are not resolved.

This project will provide better control of water stored in surface storages and provide increased in-stream flows in the later season to better guarantee quantity of supply and quality of drinking water supply. By precisely managing the release of

storage water, more water can be retained in storage to provide greater certainty of supply during extended dry periods. Relatively recent periods of water scarcity have resulted in several years of canals not operating and providing recharge, and this has heavily impacted some domestic drinking water supplies in the basin. As an example, people in the Republican Basin have in the past experienced dry wells south of McCook. This project will help manage stored water to provide greater opportunity to manage future dry seasons and avoid a repeat of these impacts. In addition, maintaining storage levels in our Reservoirs will reduce the impact of invasive vegetation species and prevent the reservoirs from becoming impaired with pollutants such as Chlorophyll A, nitrogen and phosphorous. Maintaining higher flow rates through the Republican River can improve drinking water quality and security of supply for downstream users. Drinking water quality is enhanced because water is supplied direct to the river, rather than returned as agricultural irrigation spill flows. This maintains a cleaner water supply which is free of agricultural chemicals that can be added by irrigation spill water. This solution has been adopted by our neighbors Nebraska Bostwick Irrigation District to provide these benefits downstream on the Republican River. This solution has also been adopted in response to water shortages in Australia and California to benefit the drinking water supplies of cities and municipalities

2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;

   - Identify the specific plan that is being referenced including date, who issued it and whether it is an IMP or GW management plan.
   - Provide the history of work completed to achieve the goals of this plan.
   - List which goals and objectives of the management plan the project provides benefits for and how the project provides those benefits.

The three Natural Resources Districts (URNRD, MRNRD and LRNRD) located in the Republican River Basin have all developed an Integrated Management Plan (IMP). The last modification to the plan went into effect on January 15, 2016 when it was approved by the Board for each NRD and the Director of DNR. These plans are for the most part identical in goals and objectives. The main goal of the plan is to ensure compliance with the Republican River Compact. This project supports this goal by increasing the availability of stored water in our reservoirs and providing the opportunity to make this water available for release at times that would best suit the needs of end users and of the Republican River Compact. The history of the work previously completed to achieve the goals of the Integrated Management Plan includes: 1. Conservation Reserve Enhancement Program (CREP) - Thousands of acres in the basin have utilized the CREP including acres within FCID project area. 2. Surface water and ground water leases. 3. Augmentation and retiming of stream flow. 4. Groundwater recharge using Federal projects. 5.Conjunctive management – irrigating co-mingled acres with surface water during times of excess compact allocation. This project will support and expand upon many of these previous initiatives by making more surface water and groundwater available for leases, by providing additional augmentation and retiming of stream flows, by enhancing groundwater recharge, and by

further encouraging and enabling conjunctive management. By providing these opportunities the project meets several goals of the IMPs: 1. It ensures that surface water users assume their share to keep Nebraska in compliance by allowing them to continue to grow a crop with less water diverted. 2. It improves the opportunity to grow a crop each year there and thereby reduces adverse economic, social, and environmental consequences. 3. It reduces the need for increased regulations by allowing the Reservoirs to fill and spill earlier each year and provides an opportunity for NRD to lease or purchase some of the surface water saved. 4. It enhances the canal system's groundwater recharge to many wells (irrigation and domestic) that may not have a water supply without adequate recharge in dry periods that may occur in the future. The Canal systems provide groundwater recharge to many wells (irrigation and domestic) that may not have a water supply if not for over 60 years of canal operations. Factoring in all of these opportunities that the project creates, it can be seen that it well supports the Republican River Basin's Integrated Management Plan.

3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

   List the following information that is applicable:

   - The location, area and amount of recharge;
   - The location, area and amount that aquifer depletion will be reduced;
   - The reach, amount and timing of increased streamflow. Describe how the project will meet these objectives and what the source of the water is;
   - Provide a detailed listing of cross basin benefits, if any.

   This project increases the sustainability of the Republican River Basin's aquifers and streams by increasing the opportunity for the surface water stored in FCID's supply dams to add to recharge and stream flow. At present, operational spills pass downstream at times where there may not be sufficient stream flow to ensure that the spilled water arrives at a point where it can be beneficially used. The precise management of the volume and timing of supply releases improves basin sustainability by ensuring that water is available at the time of need of downstream users and that water does not pass through the system without benefit. Better management of the timing of supply releases ensures water does not become lost to non-beneficial use such as vegetation growth along the river corridor. It is much more efficient to move large amounts of water through the system during the winter months when vegetation is dormant and the river flows and alluvial aquifer have recovered from the mining of the aquifer during the irrigation season. Maximizing the availability of this stored surface water provides additional opportunities and management options to enhance aquifer storage and increase streamflow. This project will provide the following benefits: 1. Enhanced groundwater recharge in wet years – the project's water-tight gates can be used to run specific sections of canals deeper for longer and therefore provide targeted incidental recharge, adding water availability to the system. The precise management of water-tight canal check structures allows a deeper

storage / canal driving head which enhances the recharge rate both before and after the commencement of the irrigation season, thereby adding water availability to the system along the length of the Cambridge Canal down to Harlan Reservoir. 2. Reduced excess extractions from river, groundwater and surface reservoir storage in dry years - increased surface water availability reduces the need for river diversions and groundwater pumping - thereby reducing aquifer depletion. 3. Water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river, improving water quality for downstream users. In addition river flows are increased along the reaches parallel to irrigation districts, with associated environmental benefits. These benefits provide positive impacts to all users in the river basin. The water saved with this project could be available via a "surface water lease" and used as an offset for any of the supporting NRDs. This offset could be in lieu of pumping expensive groundwater from the ground via N-CORPE. Increased stored water availability in Swanson, Hugh Butler and Harry Strunk Reservoirs reduces the need for river diversions and groundwater pumping – thereby increasing instream flows and reducing aquifer depletion. The cross-basin benefits that this provides is more opportunities and options to meet Republican River Compact obligations. This project will help Nebraska ensure compliance with the compact by reducing the amount of water needed to operate Cambridge Canal each year. A high reservoir elevation at Harry Strunk Reservoir at the end of the irrigation season will result in that reservoir filling and spilling water downstream to Harlan County Reservoir much earlier than historically occurred.

4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;

   - List the goals the project provides benefits.
   - Describe how the project will provide these benefits
   - Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

This solution retains more surface storage water in Swanson, Hugh Butler and Harry Strunk Reservoirs, allowing retiming of the release of this conserved water to contribute to multiple water supply goals including stream augmentation, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources. 1. Flood Control - The ability to remotely control the flow control gates means that operational capability can be maintained when flood waters restrict vehicular access. This allows more capability to respond to flood events by maintaining the capability to operate structures when local access is not possible. The solution's water-tight gates can provide the capability to back water up and increase the rate of groundwater recharge to reduce the rate at which flood waters pass downstream. The ability to operate the gates during a flood event also

provides more routing opportunities and volume buffering opportunities to reduce localized flood damage. 2. Agricultural Use - The proposed solution will make more surface water available longer through the growing season and thereby extend water availability and resultant crop yields. For those farmers who rely solely on surface water, the additional water availability will increase crop yields. For farmers who use a mix of surface water and ground water, additional surface water will reduce pumping of groundwater and resultant aquifer overdraft and greenhouse gas emissions. In dry years, the additional water made available with this solution can mean the difference between a successful crop and a failed crop. 3. Municipal and Industrial Uses - Increased surface water security reduces farmers' needs for river diversions and groundwater pumping – thereby increasing instream flows and reducing aquifer depletion and making more water available for Municipal and Industrial Users. The retiming of release of storage water changes the time of availability of this water for downstream municipal and industrial users to times of scarcity later in the year around August. At present, operational spills pass downstream at times where there may not be sufficient stream flow to ensure that the spilled water arrives at a point where it can be beneficially used. In most years the spills enter a tributary that is normally dry and the flows never reach the river and in some years if the water does reach the river the river is found to be dry. The ability to control the release of this recovered water allows this water to be passed downstream later in the season when instream flows have recovered. This helps ensure that the water saved reaches the next Reservoir in the system, which would be Harlan County, a key source for the State of Kansas. Water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river. 4. Recreational Benefits - Retaining more water in storage will sustain storage levels with resultant recreational benefits for reservoir users. This will benefit all recreational users of the reservoir. Nebraska Games and Parks has many examples demonstrating that higher reservoirs levels increase the number of visitations per day at the three Reservoirs associated with this project. Additional recreational benefits are provided by the ability to retime storage releases so that more water is available when the river flows are improved, providing benefit to recreational river users. 5. Wildlife Habitat - The Republican River area within the District, especially including Reclamation project waters in Harry Strunk Reservoir, is host to many additional migratory bird species that use the Central Flyway on their annual journeys. Harry Strunk Reservoir is located on the western edge of the Central Flyway. The migratory species, including shorebirds and songbirds, travel through by the millions and land on and near our lake and waterways, and although no longer listed as an endangered species, a significant population of protected Bald Eagles as well as Golden Eagles also remain resident in our district during portions of each year; several nesting pair of Bald Eagles now make a year-round home at Harry Strunk Reservoir. In addition, a very significant number of American White Pelicans utilize the Harry Strunk Reservoir within the boundaries of the District (as well as the Harlan County, Hugh Butler, and Swanson Reservoirs in the service area of the District) on their annual spring and fall migrations, and although the American White Pelican has been removed from the national list of threatened species, it is still listed as threatened

in Nebraska, is still considered endangered in other parts of the world (e.g. Alberta, Canada, location of one of the primary nesting grounds), and is protected under the Migratory Bird Treaty Act. Only approximately 100,000 American White Pelicans are believed to exist in the wild, their migratory journeys have been made more difficult in this century due to drainage of prairie wetlands and water bodies in the Great Plains, and a very large percentage of the existing birds now rely heavily on the reservoirs within our local area as some of the only remaining feeding grounds still able to support their migratory needs. The proposed project will make more water available to benefit these species and possibly help prevent some of the species from being re-listed as threatened or endangered. The species discussed above are not adversely impacted by any current Reclamation project; to the contrary, they are highly benefitted by the availability of Reclamation waters, low Reservoir pools at any of Reclamation Reservoirs in our area would pose a serious threat to these species. A low pool elevation for extended time also allows invasive vegetation to establish which also threatens animal habitat and recreation areas. The Environmental Protection Agency (EPA) has listed a few of the Federal Reservoirs as "impaired waters in Nebraska"; the 2010 pollutant identified Chlorophyll A, which is carried over from the 2008 list, total nitrogen and total phosphorus are new to the impaired waters list in 2010. Higher pool elevations would mitigate some if not all of these listed pollutants. (Species-specific information utilized above was obtained from the Nebraska Nature Conservancy, the Nebraska Game and Parks Commission, the Nebraska Bird Partnership, and the U.S. Army Corps of Engineers at Harlan County Lake). Wildlife habitat will benefit from an ability to retime release flows to buffer low flow situations that can occur late in the year. The solution provides improved water quality for downstream users and accompanying improvements in river health. Water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river. River flows are also increased along the reaches parallel to irrigation districts, with associated environmental benefits. 6. Conservation of Water Resources - Better management and use of surface storages makes more water available to the river system in times of water scarcity – thereby conserving water resources. Several agencies would benefit from better canal flow data. First of all, the water users of FCID would benefit from accurate and timely deliveries of the water supply. The State of Nebraska and the RRCA would benefit with a better understanding of the water balance of the Canal systems. Ground water irrigators would benefit from the recharge and perhaps in some areas of too much recharge, have good data would help with mitigating damages from too much recharge. Municipalities and small village along the River corridor would benefit from the canal recharge.7. Preservation of Water Resources - The ability to manage the time of release of stored water allows more stored water to be banked for future dry years, thereby preserving the water resource. These benefits of enhanced groundwater recharge, increased instream flows and improved water quality provide positive impacts to all users in the river basin.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;

- Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
- Describe the beneficial uses that will be reduced, if any.
- Describe how the project provides a beneficial impact to the state's residents.

The project will increase the beneficial use of Nebraska's water resources by making more surface water available at time of need, by reducing aquifer depletion, and by managed increases in instream flows timed to be available during times where these have been historically lower than required. The project will not result in any decrease or reduction in beneficial uses. The project provides a beneficial impact to the state's residents by sustaining agricultural yields, increasing instream flows to downstream users, ensuring cleaner water flows to downstream users, and reducing the requirement to pump groundwater with resultant reductions in greenhouse emissions and reduced load on electricity infrastructure. The project will also reduce the need for additional regulations. By making stored surface water available for beneficial use at its maximum time of need, this project can protect crops from water shortage, and can maintain stream flows during times of water shortage. By enhancing groundwater recharge in times of water surplus, the system can increase the availability of groundwater for the benefit of groundwater users and provide for enhanced and retimed streamflows. Automated operation of water tight gates during the early stages of river flows will allow the irrigation canals to be operated at their maximal recharge capability earlier in the season with less water diverted, improving and extending the recharge opportunity. The canals can be run deeper for longer and therefore provide targeted recharge, adding water availability to the system. After Harry Strunk Reservoir is filled, the availability of this stored water is maximized by managing the volume and timing of releases to match the needs of users or downstream reservoirs. The precise management of the volume and timing of supply releases improves surface water availability by ensuring that water is available to instream flows and downstream users at their time of need, and does not pass through the system without benefit earlier in the season. This has the additional benefit of increasing instream flows and reducing aquifer depletion. The project will provide improved water quality for downstream users and accompanying improvements in river health - water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river. River flows are also increased along the reaches parallel to irrigation districts, with associated environmental benefits. The project provides a beneficial impact to the state's residents by sustaining agricultural yields, increasing instream flows to downstream users, ensuring cleaner water flows to downstream users, and reducing the requirement to pump groundwater with resultant reductions in greenhouse emissions and reduced load on electricity infrastructure.

6. Is cost-effective;

- List the estimated construction costs, O/M costs, land and water acquisition costs, alternative options, value of benefits gained.
- Compare these costs to other methods of achieving the same benefits.
- List the costs of the project.
- Describe how it is a cost effective project or alternative.

The estimated construction cost of this project is $881,071. The outcome will be the ability to retime more than 1,400 acre-feet of water each year for release at the time of need of downstream users. The O&M costs over the 30-year asset life of this solution are estimated at less than 2.5% of the capex – or $22,000 per year. These O&M costs are expected to be largely offset by a reduction in existing costs such as vehicular usage and other operational costs. There are no land or water acquisition costs involved in this project. When the capital costs of the project are amortized over the 30-year asset life, this water is made available at a cost of only $21 per acre-foot per year – the value of this water is significantly greater than the cost of making it available. Experience shows that the adopted Total Channel Control automation solution typically costs as little as 1/10 the price of converting larger canals to pipeline, and generally is significantly cheaper than constructing balancing storages. The solution is economically attractive because it is adding to existing infrastructure investments and leveraging these previous investments. The costs of the project are a combination of control gate and telemetry hardware, civil works to modify existing structures, and labor associated with configuring the control system. These costs are documented in the attached product pricing spreadsheet. The water recovered by this project will be recovered and retained in surface reservoirs to be retimed for late season releases which will benefit a range of downstream interests including environmental, recreational, agricultural, and potentially interstate parties. This value will accrue each and every year of the project. The project is designed to be implemented in one year so that the full benefits of water savings can be realized in the first year following the winter construction program. Accordingly, the full project budget of $881,071 will be spent within the first year, and the full project benefits will accrue equally over the 30-year economic life of the project.

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;

- Identify the interstate compact, decree, state contract or agreement or federal law.
- Describe how the project will help the state meet its obligations under compacts, decrees, state contracts or agreements or federal law.
- Describe current deficiencies and document how the project will reduce deficiencies.

The Republican River Compact is a three state agreement between Colorado, Kansas, Nebraska and the Federal Government. This agreement sets out the amount of water that can be beneficially consumed by each state.

Nebraska is allocated 49%, Kansas 40% and Colorado 11%. Most years Nebraska's consumption of its allocation exceeds their 49% share. Nebraska relies on the retime of flows with conjunctive management and stream flow augmentation with N-CORPE to offset the overages in consumptions of its Compact allocation. The three states have agreed to a resolution that provide Kansas Bostwick Irrigation District with an irrigation supply based on Nebraska projected overage or an amount less than that if a sufficient water supply is available for Kansas' needs. This water is to be in place in Harlan County Reservoir by June 1st of each year. This project helps Nebraska achieve the goal of placing water into Harlan County by June 1st by allowing recovered water to be stored in Harry Strunk Reservoir along with augmentation water from N-CORPE. Another key compact management consideration is that it is much more efficient to move large amounts of water through the system during the winter months when vegetation is dormant and the river flows and alluvial aquifer have recovered from the mining of the aquifer during the irrigation season. The ability to control the time of release of the water recovered by this project allows this water to be passed downstream later in the season when instream flows have recovered. This helps ensure that the water reaches the next reservoir in the system and is not lost to non-beneficial use such as vegetation growth along the river corridor. At present, operational spills pass downstream at times where there may not be sufficient stream flow to ensure that the spilled water arrives at a point where it can be beneficially used or credited. This project also enhances the recharge between the confluence of Medicine Creek and Harlan County Reservoir which ensures that the river flows recover much faster than normal and the water transferred to Harlan County Reservoir would have less loss. The current deficiencies with the system is that Cambridge canal has many waste ways or spillbacks (Over 12) and its difficult to monitor and keep water from spilling due to surges in the canal flow. Most of the waste ways are located on dry tributaries to the Republican River and water spilled never reaches the River or if it does the river is so low the flows don't reach Harlan County Reservoir. With Rubicon's automated technology this project would ensure that these wasteways would not spill and the recovered water would be stored in Harry Strunk. This Project also allows for much higher pool elevations and water depth that enhances the recharge rate with the project. Recovering and Retiming of flows will help meet interstate compacts, more water availability late season or early fall that can be efficiency moved to Harlan County Reservoir along with augmentation flows from N-CORPE before the June 1st deadline.

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the Untied States such that their incapacitation would have a debilitating effect on public security or public health and safety;

    - Identify the property that the project is intended to reduce threats to.

- Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.
- Identify the potential value of cost savings resulting from completion of the project.
- Describe the benefits for public security, public health and safety.

The project would reduce the risks of loss of property on all the lands located below the Cambridge Canal project including farm land and residential property as the canal passes under the city of Oxford and Burlington Northern Railroad, which is an Amtrak passenger rail line. With this project the risk of loss is greatly reduced. With this project any flows that enter the canal from runoff events or a power outage that would shut off nearly 150 center pivots at the same time would be safely passed through the system. This project also has early warning alarms that would trigger actions by FCID personnel and local agencies and villages if the canal was at risk of overtopping. The cost saving to just the Burlington Northern Rail line would greatly exceed the installation cost of this Project. The public safety is always a big concern when running canal water through areas such as villages and towns. FCID currently operates a gage in Oxford Nebraska that is available online at: http://www.usbr.gov/gp-bin/hydromet_dayplt.pl?caoxne&qc&-4 The deficiency with this gage is that it has a 1-hour delay in the data stream and no ability for an early warning. This project has real-time telemetry within seconds and can text or email alarms to the appropriate response team. The early warning and alarms are available at every check structure and can be monitors through the system or the canal could be evacuated at one of the 12 plus waste-ways if needed.

9. Improves water quality;

- Describe what quality issue(s) is/are to be improved.
- Describe and quantify how the project improves water quality, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- Describe other possible solutions to remedy this issue.
- Describe the history of the water quality issue including previous attempts to remedy the problem and the results obtained.

During normal canal operations chemicals are used to control algae and a variety of plant vegetation with the most common infestations being pond weed. The chemicals used have been deemed safe for this treatment. However, not allowing the chemicals to leave the canal system would be most desirable management approach, and this project would accomplish this outcome. Without this project it would be impossible to eliminate discharge from the canal, the other remedy would be to reduce the inflows during treatment which may not be practicable during high irrigation demands. Historically treatment has been applied as needed, there is always an attempt to make the applications at lower

flows when less chemicals are required and less discharge from the canal due to the lower inflows. This project will also reduce the impact of invasive vegetation species and help prevent the District's supply reservoirs from becoming impaired with pollutants such as Chlorophyll A, nitrogen and phosphorous. Maintaining higher flow rates through the Republican River can improve drinking water quality for downstream users.

10. Has utilized all available funding resources of the local jurisdiction to support the program, project, or activity;

- Identify the local jurisdiction that supports the project.
- List current property tax levy, valuations, or other sources of revenue for the sponsoring entity.
- List other funding sources for the project.

Frenchman Cambridge Irrigation District has been very aggressive in seeking outside funding opportunities. FCID developed a plan to automate the canal systems in 2012. With the help of a Water and Energy Efficiency Grant (Reclamation's WaterSMART grant) and a Nebraska Kansas Area Office grant, (also Reclamation) FCID has invested over $400,000 local dollars and $400,000 Federal dollars and has partially automated two canal systems (Cambridge Canal and Bartley Canal). The District then invested in the implementation of Total Channel Control on the upper portion of the Cambridge Canal and on the Bartley Canal using a Water Sustainability Fund grant awarded in 2016 for the adoption of Total Channel Control to reduce unintentional spill on the Cambridge Canal and Bartley Canals. The next step is to continue the canal automation with additional grant funding opportunities. For FCID to be sustainable in the future we acknowledge water conservation and technology will be a key component to achieve this goal. We have visited with all three NRDs looking for support both in concept and financial support. At this time no local jurisdiction or NRD has offered financial support. Two of the three local NRDs did provide a letter of support and look forward to working with FCID and would be interested in a water lease agreement. FCID will fund this project and no local property tax levy will be used.

11. Has a local jurisdiction with plans in place that support sustainable water use;

- List the local jurisdiction and identify specific plans being referenced that are in place to support sustainable water use.
- Provide the history of work completed to achieve the goals of these plans.
- List which goals and objectives this project will provide benefits for and how this project supports or contributes to those plans.
- Describe and quantify how the project supports sustainable water use, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- List all stakeholders involved in project.
- Identify who benefits from this project.

The Nebraska Legislature has passed legislation requiring the local NRDs to adopt a plan that puts the basin on a path of sustainable management of the basin's water supply within the next 30 years. This plan is currently in the development phase and is required by law to be adopted within three years of the legislation. The history of work completed to achieve the goals of the sustainable basin plan is described in the responses to Question 2. In summary, the history of work previously completed to achieve the goals of the Integrated Management Plan includes: 1. Conservation Reserve Enhancement Program (CREP) - Thousands of acres in the basin have utilized the CREP, including acres within the FCID project area. 2. Surface water and ground water leases. 3. Augmentation and retiming of stream flows. 4. Groundwater recharge using Federal projects. 5. Conjunctive management – irrigating co-mingled acres with surface water during times of excess compact allocation. The history of work completed to achieve the specific outcomes of this project includes the collaboration with the NRDs to define the implementation and benefits and obtain support for this project. This project helps meet the goal of the basin plan to achieve sustainable management by preventing the average yearly spill of 1,400 acre-feet per year from the lower reach of the Cambridge Canal and allowing retiming of the release of this conserved water to contribute to multiple water supply goals including stream augmentation, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources. This project supports these goals by increasing the availability of stored surface water in FCID's storage reservoirs and providing the opportunity to make this water available for release at times that would best suit the needs of end users and of the Republican River Compact. The project will benefit the 45,000 acres serviced by FCID and will also benefit the users of water downstream on the Republican River including Nebraska Bostwick Irrigation District and Kansas. By enhancing the quantity and quality of water in our surface storages and the quality and quantity of instream flows in the Republican River the project will benefit residential, industrial, agricultural and recreational users in the lower Republican River Basin. This solution retains more surface storage water in our reservoirs, allowing retiming of the release of this conserved water to benefit multiple users of this water supply including stream augmentation, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources. The history of work completed to achieve the goals of these plans is described in the response to Question 10. A description of how the project supports sustainable water use is provided in the response to Question 4 and Question 5. A list of parties that will benefit from this project is provided in the responses to Question 4 and Question 5.

12. Addresses a statewide problem or issue;

- List the issues or problems addressed by the project and why they should be considered statewide.

- Describe how the project will address each issue and/or problem.
- Describe the total number of people and/or total number of acres that would receive benefits.
- Identify the benefit, to the state, this project would provide.

This project will help Nebraska ensure compliance with the Republican River Compact by reducing the amount of storage water needed to operate the Cambridge Canal each year. Compact compliance is a statewide issue. This project will help the State ensure the required compliance by the most practical and economic means by banking the saved water. This banked water could be made available to help the State meet its obligation. Non-compliance is not an option, and the state must focus its efforts on meeting compliance by the most practical and economic means. This project could bank some of the saved water within Harry Strunk and this banked water could be made available to help the State meet its obligation. For the most part all tax payers in the State would receive a benefit like they did in 2007 when FCID sold 26,000 acre-feet to the local NRD to avoid non-compliance that was projected in 2007. As a result of this action Nebraska tax payers only paid $5.5 million to Kansas for non-compliance in 2005 and 2006. The water that will be retained in storage can be retimed to return to the stream at times of peak demand and need in August. The saved water could also be utilized to retime Compact augmentation water before it is actually pumped from the ground. This would help further insure that Nebraska meets all deadlines associated with future Compact resolutions. With the newly developed Integrated Management Plans (IMP) developed by the State of Nebraska and local Natural Resources Districts (NRD) one management action identified as a tool to help Nebraska achieve compliance is “Surface Water Leases”. The water saved with this project could be available via this same marketing mechanism and used as an offset for the supporting NRD. This offset could be in lieu of pumping expensive groundwater from the ground via N-CORPE. The project addresses the impact of water scarcity upon the state by increasing the available stored water which can help many parties prosper through dry conditions, including the agricultural economy, the tourism economy, and the municipal and urban water users who rely on aquifers and stream flows for their water supplies. In addition to this primary benefit, the following secondary benefits are also delivered: 1.Useful geologic information on rate of groundwater recharge to assist in RRCA operations. 2. Downstream users can benefit from the availability of this conserved surface water, which enables managed releases at times of peak demand in August. 3. This saved water can potentially be used to retime Compact augmentation water. 4. Early season enhanced groundwater recharge will enhance aquifer storage and assist in reducing aquifer depletion. 5. Enhanced recreational outcomes resulting from an increase in the volume of water retained in the reservoirs. 6. Wildlife benefits for migratory bird species. 7. Reduction in invasive vegetation with improved water quality outcomes.

13. Contributes to the state’s ability to leverage state dollars with local or federal government partners or other partners to maximize the use of its resources;

- List other funding sources or other partners, and the amount each will contribute, in a funding matrix.
- Describe how each source of funding is made available if the project is funded.
- Provide a copy or evidence of each commitment, for each separate source, of match dollars and funding partners.
- Describe how you will proceed if other funding sources do not come through.

Frenchman Cambridge Irrigation District is the funding partner and is willing to commit to 40% cost share. FCID Funds are generated from annual assessments to its water customers and funds designated in our budget for water conservation. See attached resolutions 2-18 adopted by the board of Directors for FCID

14. Contributes to watershed health and function;

- Describe how the project will contribute to watershed health and function in detail and list all of the watersheds affected.

This project will enhance water sustainability in the Republican River basin by providing the following benefits: 1. Enhanced groundwater recharge in wet years - water-tight gates can be used to run specific sections of canals deeper for longer and therefore provide targeted incidental recharge, adding water availability to the system. 2. Reduced excess extractions from river, groundwater and surface reservoir storage in dry years - increased surface water availability reduces the need for river diversions and groundwater pumping - thereby reducing aquifer depletion. 3. Improvements in water quality for downstream users and accompanying improvements in river health - water quality and river health improvements are achieved by minimizing the spill of irrigation water back into the river. In addition, river flows are increased along the reaches parallel to irrigation districts, with associated environmental benefits. These benefits provide positive impacts to all users in the river basin. The FCID canal systems have been in place for over 60 years. People have relied on recharge from the canal systems to help maintain their domestic wells and maintain small springs that have come to be on their property because of the canal system and its recharge. Some of these springs provide livestock water in remote parts of pastures. Experience in the west parts of the Basin has shown what can happen when canals cease to exist or have intermittent operations. This project would help insure that the annual recharge would continue into the future.

15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- Identify the date of the Annual Report utilized.
- List any and all objectives of the Annual Report intended to be met by the project
- Explain how the project meets each objective.

The most important annual report utilized by the State for the Republican River basin is the final computation by the Republican River Compact Administration reporting the basin's water supply and the water consumed by each state. This report is adopted at the annual RRCA meeting held each year in August. From these numbers the compliance test is measured and that is the overall objective of the State and residents of the Republican River Basin. This project would capture spills from the Cambridge Canal and consolidate them in Harry Strunk Reservoir and would make them available to better manage the approach to ensuring interstate Compact compliance.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate which furthers the goals of the WSF, then:

- Describe the federal mandate.
- Provide documentary evidence of the federal mandate.
- Describe how the project meets the requirements of the federal mandate.
- Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.

The Republican River Compact is a Federal mandate. See the attached Republican River Compact. The compact is very simple, don't consume more than your states' allocation. This project helps greatly reduces the non-beneficial use and retains it in Harry Strunk Reservoir. FCID also has contract repayment obligations to the Federal Government until the year 2060. Implementing projects such as this project is a step in the right director to ensure that this contract can be paid back as scheduled. See attached Contract 009D6B0122 and amendments.

Section D.

PROJECT DESCRIPTION

1. Overview

In 1,000 characters *or less*, provide a brief description of your project including the nature and purpose of the project and objectives of the project.

Phase 2 of the Frenchman Cambridge Storage Enhancement and Retiming Project will enhance water sustainability in the Republican River basin by recovering more than 1,400 acre-feet of unmanaged operational spill from the lower reaches of the Cambridge Canal each year. This water will be retained in surface storage reservoirs allowing retimed release to contribute to enhanced groundwater recharge, stream augmentation, flood control, sustained crop production, preservation of wildlife habitat, and assisting with interstate compact compliance. Precise control of flows through the Cambridge Canal will allow enhanced groundwater recharge in wet years, reduced excess river extractions, enhanced groundwater and surface reservoir storage in dry years and improved water quality for downstream users and accompanying improvements in river health. Precise flow measurement and control gates will be installed on the lower reaches of the Cambridge Canal. A control system will continually update real-time flow setpoints through the canal so that the supplied flows precisely match the downstream demand, and unintended operational spill is eliminated.

2. Project Tasks and Timeline

Identify what activities will be conducted by the project. For multiyear projects please list what activities are to be completed each year.

The project construction which involves the installation of flow control gates into existing structures will be undertaken over the winter of 2018. The project will be installed an operational for the 2019 irrigation season.

3. Partnerships

Identify the roles and responsibilities of agencies and groups involved in the proposed project regardless of whether each is an additional funding source. List any other sources of funding that have been approached for project support and that have officially turned you down. Attach the rejection letter.

Three important partnership exist in the basins with regards to this project. Frenchman-Cambridge Irrigation District is located within two NRDs, the MRNRD and the LRNRD both have provided letters of support and acknowledge the benefit to all irrigators in the basin and the long term benefit to all Nebraskans

with regards to Compact compliance. The NRDs play an important role in the basin with regards to groundwater management and the associated depletions to the streamflow that is allowed under the Compact. Additionally, the United States Bureau of Reclamation supports this project and the positive effect this project will have on the management of Federal Reservoirs in the basin and the many recreational benefits to the area from improved lake elevations. Reclamation has many water users under these federal projects that rely on the irrigation water for they livelihood. Reclamation can also take the information learned from this project and other projects like this and apply them to other areas in the western United States that they also manage. FCID did not request additional funds from other partners at this time. It is our hope to have long term agreements with local partners that will allow FCID the opportunity to lease some of the water saved. This project would help reduce the need to mine expensive groundwater at the headwaters of Medicine Creek. FCID would like to see this water stay in the ground for future generations. Sustaining the streamflow for Harry Strunk and the other streams in the basin is very important to FCID and our customers.

4. Other Sources of Funding

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources are not obtained.

The costs of the entire project will be $881,071. FCID serves 45,669 acres. Each year FCID budgets approximately $0.50 to $2 dollars per acre for water conservation as needed, and will increase that after this project is approved if needed. We plan to recapture some of the cost with long and short term water lease agreements with local partners.

5. Support/Opposition

Discuss both support and opposition to the project, including the group or interest each represents.

Frenchman Cambridge Irrigation District and Rubicon Water has visited each of the NRD and the Bureau of Reclamation. We have also visited with Kansas Bostwick Irrigation District about automating the head gate at Guide Rock Diversion Dam so that all the releases from Harlan County Reservoir would be captured by the Kansas Bostwick Irrigation District. Everyone has approved of the project and are interested in the technology. We have not received any opposition from groups or Individuals.