

NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: **Lower Elkhorn Water and Soil Conservation Program**

PRIMARY CONTACT INFORMATION

Entity Name: **Lower Elkhorn Natural Resources District**

Contact Name: **Mike Sousek, General Manager**

Address: **601 E Benjamin Ave # 101, Norfolk, NE 68701**

Phone: **(402) 371-7313**

Email: **msousek@lenrd.org**

Partners / Co-sponsors, if any: **Natural Resources Conservation Service, Regional Conservation Partnership Program**

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

Grant amount requested. **\$900,000**

Loan amount requested. **\$ N/A**

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

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

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 <input checked="" type="checkbox"/> Obtained: YES <input type="checkbox"/> NO <input type="checkbox"/>
USACE (e.g., 404 Permit)	N/A <input checked="" type="checkbox"/> Obtained: YES <input type="checkbox"/> NO <input type="checkbox"/>
Cultural Resources Evaluation	N/A <input checked="" type="checkbox"/> Obtained: YES <input type="checkbox"/> NO <input type="checkbox"/>
Other (provide explanation below) N/A	N/A <input checked="" type="checkbox"/> Obtained: YES <input type="checkbox"/> NO <input type="checkbox"/>

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) _____

6. Complete the following if your project has or will commence prior to next July 1st.

As of the date of submittal of this application, what is the Total Net Local Share of Expenses incurred for which you are asking cost share assistance from this fund? \$ **N/A**

Attach all substantiating documentation such as invoices, cancelled checks etc. along with an itemized statement for these expenses. **N/A**

Estimate the Total Net Local Share of Expenses and a description of each you will incur between the date of submittal of this application and next July 1st for which you are asking cost share assistance from this fund.
\$ **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);
N/A

A description of all field investigations made to substantiate the feasibility report (004.01 B); **N/A**

Maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C); **N/A**

A description of any necessary water and land rights and pertinent water supply and water quality information, if appropriate (004.01 D);
N/A

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

Required geologic investigation (004.01 E 1); **N/A**

Required hydrologic data (004.01 E 2); **N/A**

Design criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3). **N/A**

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 citizens of the Lower Elkhorn Natural Resources District (LENRD) depend on abundant, clean water in their homes for domestic use, on their farms for agricultural production, and for their industries to maintain economic viability. Wildlife that live and migrate through the LENRD depend on clean water for sustenance and habitat. Furthermore, human inhabitants of the LENRD use water

in rivers and lakes for recreation including fishing, hunting, boating, and swimming.

Both rural and urban inhabitants along the Elkhorn River have relied on the abundant water resources of the area and over time their water use has increased. During the drought of 2012, the water resources were severely stressed and the results were dramatic. Heavy irrigation during the very hot and dry conditions in late 2012 caused groundwater declines in 99% of the monitoring wells and 66% of the wells showed the largest one-year decline on record. Over 130 complaints were received at the LENRD from well owners that reported low or no water pressure from their private wells during the irrigation season.

Following the drought of 2012, it was clear to leaders at the LENRD and citizen stakeholders that water planning needed to be initiated to provide a framework for how to sustainably manage their water resources. Since that time, several actions have been taken to mitigate the immediate issues and implement changes to water management. This grant application, to provide funding to cost-share on the installation of water meters for all irrigation wells in the district, is a critical component of the actions taken by the LENRD.

To illustrate the level of commitment by the LENRD to sustainably manage their water resources, the following actions have taken place:

- In late 2012 and into 2013, the LENRD funded a cost-share program to help well owners with well repairs to address the water access issues. Over \$500,000 of work was completed to correct these problems, where appropriate.
- In 2014, the LENRD voluntarily developed a Water Inventory Report¹ and a water balance study to document the current understanding of the District's water supplies and demands.
- In 2014 and 2015, a draft Integrated Management Plan² was developed in collaboration with the Nebraska Department of Natural Resources (NDNR) with extensive local stakeholder involvement.
- In 2015, a significant change to the Groundwater Management Plan³, Rules and Regulations was approved by the Board of Directors. The changes included a requirement for all irrigation wells to install water meters in order to better document the demands for groundwater by agricultural water users.
- In 2015, the LENRD applied for a Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program (RCP) grant to fund a comprehensive conservation practices to address groundwater quality and quantity uses.

¹ Olsson Associates, 2015, Water Inventory Report for the Lower Elkhorn Natural Resources District.

² Lower Elkhorn Natural Resources District, 2015, Draft Integrated Management Plan, in progress.

³ Lower Elkhorn Natural Resources District, 2015, Groundwater Management Plan, 2015 revision.

The nature and purpose of this project is straight forward. There are currently 5,584 active registered irrigation wells in the district with roughly 1,000 flow meters already installed. The \$1.5 million will be used to provide a cost-share of \$500 toward the purchase price of up to 3,000 water meters in the LENRD. The RCPP grant will cover an additional 368 flow meters along with significant education, nutrient management, water and soil conservation practices. It is anticipated that approximately 20% of producers will choose not to participate in the program and will purchase the required water meters on their own.

The objectives of the cost-share program are as follows:

- To provide financial assistance to participating producers to comply with the new groundwater management requirements.
- To provide accurate data for annual water use reports submitted by producers in the LENRD.
- To provide agricultural water use data for groundwater models including both the Central Nebraska (CENEB) Model and the Elkhorn Loup Model (ELM).
- To provide the LENRD with documentation of water use which will be critical in drought years when allocations or other management practices may be required.

Ultimately, the LENRD has initiated this cost-share project to better document the impact of agricultural water use on the water supplies in the district. Proper documentation of water use will enable the LENRD to enact appropriate water management rules and regulations to avoid the issues of wells drying up as seen in the drought of 2012. It will also provide accurate data that can be used in groundwater modeling to evaluate conjunctive water management projects developed to benefit the downstream water users in the Lower Platte Basin.

This project is truly a public/private partnership where producers are paying approximately 80% of the purchase and 100% of the installation price for the water meters. The remaining 20% or \$500 for up to 3,000 water meters is funded with \$600,000 (40% match) provided by the LENRD, and the remaining \$900,000 (60%) through the Water Sustainability Fund. An additional \$1.5 million is being requested through the Federal NRCS RCPP grant to support additional water meters along with soil and water conservation practices that are protective of the natural resources in the LENRD. Therefore, with the commitment of \$900,000 from the WSF, \$600,000 through the LENRD, and an additional \$1.5 million through the NRCS RCPP, the LENRD will be able to take one significant step forward for water sustainability across the entire District.

A description of field or research investigations utilized to substantiate the project conception (004.02 B); N/A

A description of the necessary water and/or land rights, if applicable (004.02 C);

Cost-share will only be granted to applicants with irrigation wells that are properly registered with the Nebraska Department of Natural Resources.

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 project is anticipated to have positive effects on the operation of existing irrigation and domestic wells in the LENRD. During the 2012 drought, significant drawdown was documented in over 66% of the monitoring wells across the LENRD. This caused conflicts between domestic and irrigation well users. The infrastructure for both domestic and agricultural well users was at risk as wells dried up. By installing flow meters on all irrigation wells, agricultural producers will become more aware of their water uses and become more efficient in their operations. Additionally, in periods of drought, flow meters are a necessary tool for effective groundwater management through the implementation of groundwater allocations.

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative.

The next best alternative to installing flow meters on irrigation wells is to estimate water use through electricity usage records. In the Republican River Basin during litigation with Kansas, initially only a portion of the irrigation wells had flow meters. For the remainder of the basin, water use was estimated using electrical records. After comparing the water use data from the flow meters with the estimates based on electrical records, it was clear that the flow meter data was much more accurate. For this reason, during the Kansas v. Nebraska litigation, the states agreed that all irrigation wells must have flow meters. Electrical records are the next best alternative when flow meters are not available, however, for the LENRD, where irrigation season demands are localized to specific areas of the district and accurate flow information is needed to fully understand the complex hydrogeologic factors that impact flow, electrical records will not provide adequate data to ensure use is sustainable.

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 LENRD plans to cost share up to \$500 towards the purchase of a water meter for all registered irrigation wells in the District. The cost for installation and maintenance of the meter are not included in this grant application as they will be covered by the well owner. There are approximately 4,500 un-metered irrigation wells in the LENRD. The cost share for this grant is for 3,000 meters at \$500 each for a total of \$1.5 million. It is anticipated that a certain number of producers will pay the entire cost of the meter and not opt into the cost share program

- 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).

Water sustainability can only be achieved by balancing the water supply and the water use in an area. Currently, the water supply in the LENRD is monitored through a network of surface water gages and groundwater monitoring wells. The largest water use across the district, however, is currently not well documented. Approximately 4,500, or 80%, of the irrigation wells across the district are not metered. The first of four goals in the draft IMP developed by the LENRD in collaboration with the Nebraska Department of Natural Resources was to “Develop and maintain a water supply and use inventory based on the best available data and analysis”. By providing financial assistance to the largest water users in the basin, the benefit will be a comprehensive understanding of the basin’s largest water use. This will lead to the development of water management policies that are based on accurate water use data such that the water usage rates can be matched to the water supply, ultimately leading to water sustainability. Additional tangible benefits include reductions in water use as inefficiencies in distribution and operation systems are better understood.

- 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). **See Attachment A.**
- 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).

The project is anticipated to have positive effects on the operation of existing irrigation and domestic wells in the LENRD. During the 2012 drought, significant drawdown was documented in over 66% of the monitoring wells across the LENRD. This caused conflicts between domestic and irrigation well users. The infrastructure for both domestic and agricultural well users was at risk as wells dried up. By installing flow meters on all irrigation wells, agricultural producers will become more aware of their water uses and become more efficient in their operations. Additionally, in periods of drought, flow meters are a necessary tool for effective groundwater management through the implementation of groundwater allocations. The project is economically feasible because even a minor reduction in agricultural water use equates to a substantial savings. For example, if there were an annual 1% reduction in agricultural water use, according to Nebraska Department of Natural Resources records, that would equate to approximately 1,383 acre feet in groundwater use reduction on average for each of the last 25 years (<http://data.dnr.ne.gov/insight/>). The price of water varies across the country but ranges from \$50 to \$2,500 per acre foot. Using the lowest estimate of \$50 per acre foot for 25 years, the benefit would be \$1.72 million. Thus, using a very conservative estimate, the benefit of this project outweighs the cost.

4. Provide evidence that sufficient funds are available to complete the proposal.

See Attachment B from the General Manager of the LENRD documenting the Natural Resources District's 2016 budget and line item 36 in the budget summary that provides assurance that the LENRD has funds that are more than adequate to cover the cost-share program.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).
N/A
6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.
N/A
7. Describe how the plan of development minimizes impacts on the natural environment.

This project will have no negative impact on the environment.

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

The LENRD is well qualified to carry out the project. They have the staff and expertise to manage a cost-share program such as proposed in this application. They have successfully implemented numerous cost-share programs in accordance with the Natural Resources Conservation Service (NRCS) Federal requirements. The LENRD has a wide range of statutory responsibilities and authorities, including but not limited to Nebraska Revised Statutes 2-3,201 through 2-3,243 and 46-701 through 46-755. As the state's preferred regulator of groundwater the LENRD is clearly both qualified and responsible to carry out the proposed project.

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

This project is being implemented to assist with putting into practice the requirements in the LENRDs Groundwater Management Plan⁴ (GMP) and draft Voluntary Integrated Management Plan⁵ (IMP). Both the GMP and the IMP were developed through the authority granted by the Groundwater Management and Protection Act (GMPA).

The 2015 GMP issued by the LENRD identified two district-wide requirements: 1) wells designed to pump more than 50 gallons per minute must be permitted by the district prior to well construction, and 2) flow meters must be installed on all active irrigation wells. The cost-share program will provide financial assistance to agricultural producers that are now required to install the meters by January 2018.

Additionally, this project directly addresses the second objective of the first goal in the voluntary IMP currently being developed by the LENRD in collaboration with the Nebraska Department of Natural Resources (NDNR). The first goal is designed to provide valuable water supply and water use information to the LENRD and NDNR. The second objective under this goal is to develop and maintain a comprehensive database of the location and source of the basin's water uses. The draft IMP states that in addition to an understanding of water supplies, an understanding of water uses is equally important. By providing financial assistance to producers to install flow meters on irrigation wells, the district will gain valuable information on water use of its largest water user.

10. Are land rights necessary to complete your project?

YES NO

⁴ Lower Elkhorn Natural Resources District, 2015, Groundwater Management Plan, 2015 Revision.

⁵ Lower Elkhorn Natural Resources District, 2015, Draft Integrated Management Plan, in progress.

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.

Nebraska's Natural Resources Districts (NRDs) are specifically tasked by the legislature to manage groundwater as well as the hydrologically connected groundwater and surface water. In the Groundwater Management and Protection Act, financial and other incentive programs are referenced 19 times and the necessary authority is granted to NRDs to implement such programs.

12. Identify the probable environmental and ecological consequences that may result as the result of the project.

There are no negative environmental or ecological consequences that may result from implementing this project. On the contrary, the probable environmental and ecological consequences of this project are positive with a reduction in agricultural water use and a better system of groundwater management. The reduction will come as agricultural producers have accurate water use data upon which to base their decisions on water applications. By receiving accurate water use reports from the agricultural producers across the district, the LENRD will be able to manage groundwater use in a manner that achieves and sustains a balance between water uses and water supplies. This will provide environmental benefits to the inhabitants of the LENRD, human, plant and animal, by maintaining adequate groundwater and surface water supplies for their use.

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.

The Lower Elkhorn Natural Resources District (LENRD) is home to 89,256 residents, all of whom rely on groundwater as their primary source of drinking water. In 1997, the LENRD created a Groundwater Management Area in a portion

of Pierce County due to the presence of nitrates in groundwater that exceeded the Maximum Contaminant Level (MCL). The area was later expanded and now includes an area across four adjacent Natural Resources Districts (NRDs). In addition to the Bazile Creek Management Area, as it is now called, nitrate contamination has affected numerous communities within the LENRD. Some of the affected communities have received Administrative Orders from the state regulatory agencies due to the persistent presence of nitrate in regular sampling events.

In the Bazile Creek Groundwater Management Area, a Groundwater Management Plan⁶ was approved in October 2014 that contains numerous actions and tasks including:

- **User Education**
 - a. Prepare bi-annual mailings explaining the groundwater concerns, best management practices (BMPs), cost share programs, etc.*
 - b. Issue periodic news releases*
 - c. Hold a minimum of three meetings, workshops or seminars to further educate producers*
 - d. Initiate one-to-one contact with producers to facilitate the implementation or further implementation of BMPs*
 - e. Educate communities in the area on the benefits of wellhead protection management planning*
- **Soil Sampling**
 - a. Require annual soil sampling for any crop (including turf grass) where >50 lbs per acre per year of organic or inorganic nitrogen will be applied.*
 - i. Each sample will only be representative of 40 acres*
 - ii. Sampling depths will be 0-8" and 8"- 24"*
 - iii. Producers are encouraged to sample 24"- 48"*
 - b. Each soil sample must include a cation exchange capacity and organic matter analysis*
 - c. It is recommended NRDs provide cost share*
- **Irrigation Water Sampling**
 - a. Irrigation water will be sampled every other year in line with the NRDs groundwater monitoring schedules*
 - i. Irrigation water users are encouraged to sample water annually*
 - b. It is recommended NRDs provide cost share*
- **Water Well Flow Meters**
 - a. Each operator is required to have at least one irrigation system flow meter installed*

⁶ Upper Elkhorn Natural Resources District, 2014, Bazile Creek Groundwater Management Plan Area, developed jointly by Nebraska Department of Environmental Quality, Lewis and Clark Natural Resources District, Lower Elkhorn Natural Resources District, Lower Niobrara Natural Resources District, and the Upper Elkhorn Natural Resources District.

- b. Larger operations (>10 systems) will be required to have at least one meter installed per 10 existing systems (i.e. 11 systems will require two flow meters)*
 - c. All new and replacement wells will be required to install a flow meter*
 - d. Meters must be installed within five years of plan approval*
 - e. NRDs will develop a meter inspection program to ensure flow meters are maintained in good working order*
- **Soil Moisture Sensors and Irrigation Scheduling**
 - a. Each operator is required to install and utilize at least one soil moisture sensor for irrigation scheduling*
 - b. Larger operations (>10 irrigation systems) will be required to have installed and used at least one soil moisture sensor per 10 wells (i.e. eleven systems will require two sensors)*
 - c. Implementation should be completed within five years of plan approval*
- **Fall Fertilizer Application**
 - a. No nitrogen fertilizer (organic or inorganic) shall be applied between post-harvest and November 1.*
 - b. Surface applied organic nutrients will be exempted from this if the application is in compliance with future cropping needs and a nutrient management plan.*
- **Winter Application**
 - a. Nitrogen fertilizer applications to frozen or snow covered ground will not be allowed without district permission*
- **Manure Applications**
 - a. All manure applied will be based on a nutrient analysis*
 - b. Require applicator to uniformly apply organic nutrients.*
 - c. Application equipment should be maintained and calibrated*
- **Crop Tissue Analysis**
 - a. Each producer will be required to complete one growing season tissue analysis and one late season stalk nitrate test within five years of the plan approval*
- **Split Fertilizer Applications**
 - a. Split application of nitrogen fertilizer will be required where the soil cation exchange capacity is <10 mg/l.*
 - b. In soil types where the cation exchange capacity is >10 mg/l, one-to-one contact with producers should be undertaken to increase split applications on 50% of the BGMA*
- **Fertilizer application through irrigation system (fertigation)**
 - a. Work with producers to achieve 90% of corn producers utilizing fertigation*
 - b. NRDs are encouraged to provide cost share*
- **Nitrification Inhibitors**
 - a. Encourage the use of nitrification inhibitors through education*
- **Variable application and precision farming**

- a. Create a partnership with local fertilizer distributors and crop consultants to create demonstration field(s)*
 - b. Demonstrations will include nitrification inhibitors; growing season tissue analysis and late season stalk nitrate test*
 - c. Demonstration fields will incorporate multiple BMPs including no-till, cover crops, etc.*
- **Nitrogen Budgeting/Accounting**
 - a. Require producers to document nitrogen requirements and usage for all fields where >50lbs per acre of nitrogen is applied.*
 - b. NRDs are encouraged to utilize a common reporting form or other form that contains the required information*
- **Sub-surface Irrigation**
 - a. Work with a sub-surface irrigation system distributor to establish one demonstration field that includes the usage of a fertigation system*
- **Irrigation Well Rehabilitation**
 - a. Implement water well construction standards that protect confined layers*
 - b. Work with the Nebraska Water Well Standards Board to conduct a well rehabilitation demonstration.*
- **Vadose Zone Sampling**
 - a. The NRDs will establish baseline vadose zone nitrate conditions and conduct periodic reassessments including the 10 and 20 year time frame*
- **Urban BMP Demonstrations**
 - a. Develop urban demonstration and education sites*
 - b. Demonstration should include multiple applicable BMPs including rain gardens, rain barrels, tree box filters, vegetated swales, etc.*
- **Areas of Significant Concerns**
 - a. The NRDs will monitor the progress of the actions and tasks undertaken and where necessary increased management will be undertaken which may include regulatory actions.*

The fourth action item in the plan included the requirement to install flow meters on irrigation wells within the management area. Now flow meters are required district-wide and this grant application will support implementation of the program. This grant application to fund a cost-share of \$500 for up to 3,000 water meters along with the addition of the cost-share for an additional 368 meters and water and soil conservation practices through a complementary Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program (RCPP) grant should make a significant impact on water quality across the LENRD. As an example, in the Central Platte NRD, a study completed by the University of Nebraska identified that nitrates had been increasing at a rate of 0.5 ppm annually with an average concentration of 19.24 ppm in 1987. Following implementation of their groundwater management plan's regulations, the average

nitrate levels gradually decreased to approximately 15.05 ppm by 2012 (Central Platte Natural Resources District, 2014⁷ and Exner et al, 2010⁸).

If the grant is not funded, the effects of continued nitrate leaching will affect more communities across the LENRD and lead to additional Administrative Orders being assigned to communities with drinking water that does not meet safe drinking water standards.

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 2015 Groundwater Management Plan⁹ (GMP) issued by the LENRD identified two district-wide requirements: 1) wells designed to pump more than 50 gallons per minute must be permitted by the district prior to well construction, and 2) flow meters must be installed on all active irrigation wells. The cost-share program will provide assistance in complying with this requirement by providing financial assistance to agricultural producers that are now required to install flow meters by January 2018.

This project directly addresses the second objective of the first goal in the voluntary Integrated Management Plan¹⁰ (IMP) currently being developed in collaboration with the Nebraska Department of Natural Resources (NDNR). The first goal is designed to provide valuable water supply and water use information to the LENRD and NDNR. The second objective under this goal is to develop and maintain a comprehensive database of the location and source of the basin's water uses. The draft IMP states that in addition to an understanding of water supplies, an understanding of water uses is equally important. By providing financial assistance to producers to install flow meters on irrigation wells, the district will gain valuable information on water use of its largest water user. The plan will be approved and implemented by the LENRD and NDNR in early 2016.

The LENRD, with the authority granted by the Legislature in 1972, can enact and enforce regulation to manage resources within the boundaries of the LENRD. After the 2012 drought, several groundwater quantity subareas were more

⁷ Central Platte Natural Resources District, 2014, Groundwater Quality Management Program. Central Platte Natural Resources District. <http://www.cpnrd.org/GWMP.html>

⁸ Exner, M.E., Perea-Estrada, H., Spalding, R.F., 2010, Long-Term Response of Groundwater Nitrate Concentrations to Management Regulations in Nebraska's Central Platte Valley, The Scientific World Journal, 10, 286-297.

⁹ Lower Elkhorn Natural Resources District, 2015, Groundwater Management Plan, 2015 Revision.

¹⁰ Lower Elkhorn Natural Resources District, 2015, Integrated Management Plan, in progress.

intensively managed to reduce conflicts between water users in the district. Within the quantity subareas, flow meters were required for all irrigation wells. Approximately 1000 flow meters have been installed in the past three years. Completion of the proposed cost-share project will assist agricultural producers to become compliant with the new LENRD regulations in the GMP that required flow meters on all irrigation wells across the entire district.

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

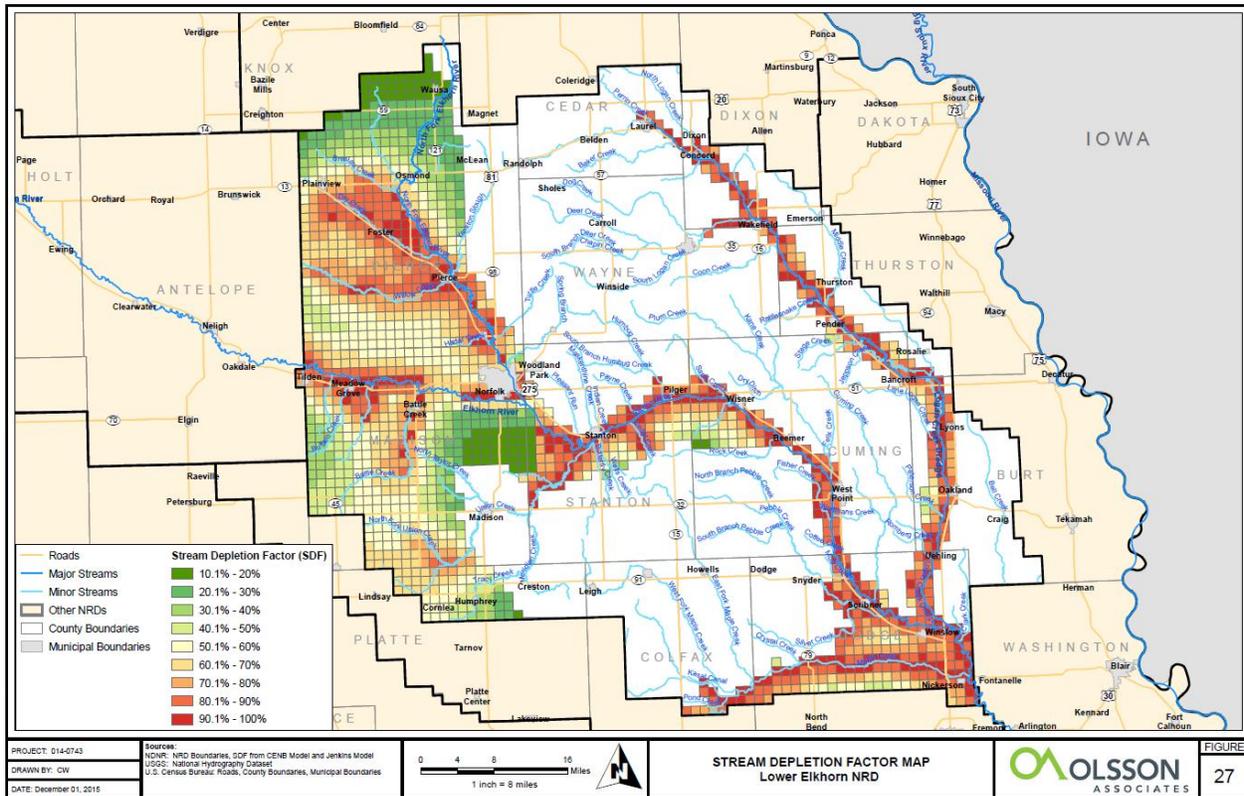
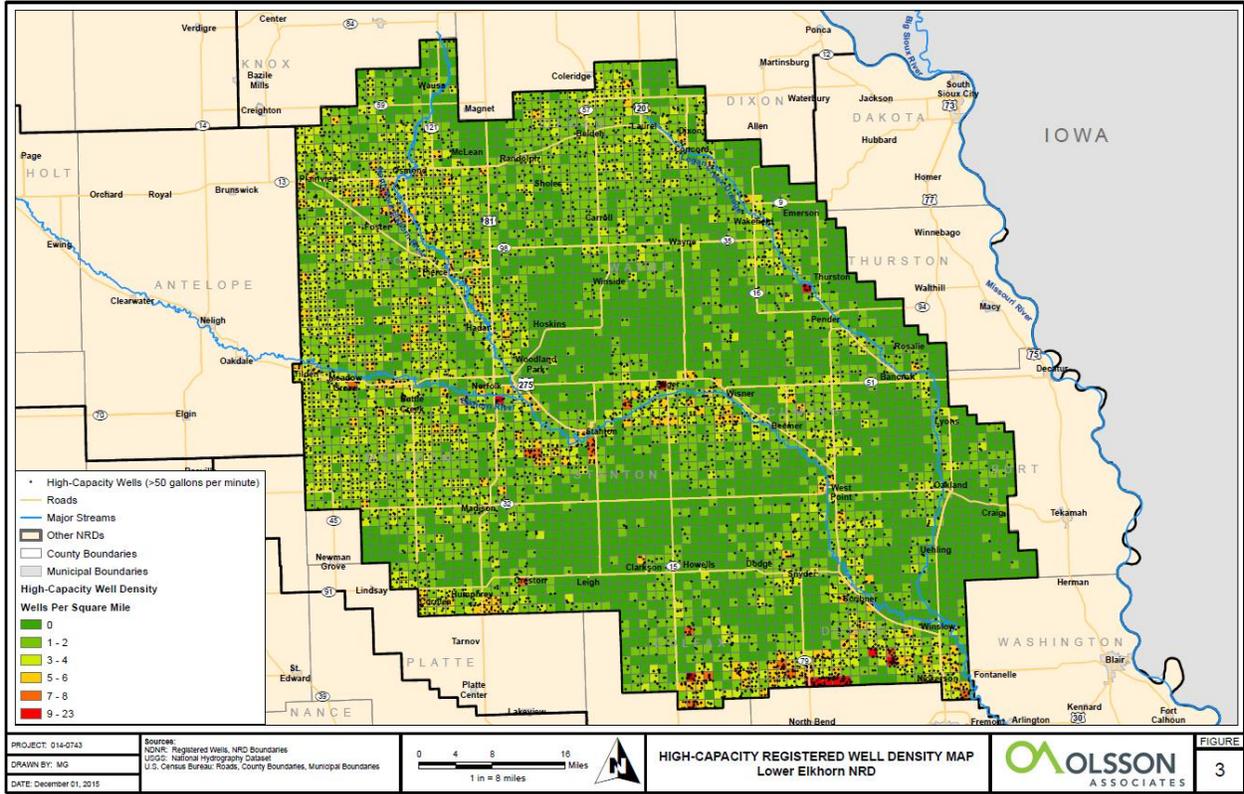
List the following information that is applicable:

- 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.

The drought of 2012 provided the LENRD a stark reminder that the only way to address water sustainability is to know the current usage of the largest water user in the district. By installing flow meters on all irrigation wells, agricultural producers will become more aware of their water uses and become more efficient in their operations, which will reduce aquifer depletion and minimize water well conflicts in times of drought. Additionally, in periods of drought, flow meters are a necessary tool for effective groundwater management through the implementation of groundwater allocations. Therefore, the installation of flow meters will allow for efficient and effective management of aquifer depletion in the areas where the well density and water usage is the highest (on the next page, see Figure 3 from the LENRD Water Inventory Report, 2015¹¹).

By reducing withdrawals in the portions of the LENRD that are hydrologically connected to surface water, the reductions in pumping could positively affect streamflow along the Elkhorn River by reducing the effects of pumping in accordance with the stream depletion factors ascribed to the district by the NDNR (on the next page, see Figure 27 of the LENRD Water Inventory Report, 2015¹¹).

¹¹ Olsson Associates, 2015, Water Inventory Report for the Lower Elkhorn Natural Resources District.



The objectives of the cost-share program are as follows:

- **To provide financial assistance to participating producers to comply with the new groundwater management requirements.**
- **To provide accurate data for annual water use reports submitted by producers in the LENRD.**
- **To provide agricultural water use data for groundwater models including both the Central Nebraska (CENEB) Model and the Elkhorn Loup Model (ELM).**
- **To provide the LENRD with documentation of water use which will be critical in drought years when allocations or other management practices may be required.**

Ultimately, the LENRD has initiated this cost-share project to better document the impact of agricultural water use on the water supplies in the district. Proper documentation of water use will enable the LENRD to enact appropriate water management rules and regulations to avoid the issues of wells drying up as seen in the drought of 2012. It will also provide accurate data that can be used in groundwater modeling to evaluate conjunctive water management projects developed to benefit the downstream water users in the Lower Platte Basin.

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.](#)

The main goals of the proposed larger Regional Conservation Partnership Program (RCPP) and Water Sustainability Fund (WSF) project are to assist the LENRD achieve water sustainability:

- **To provide accurate water use data to the LENRD so that water supply and water use are in balance**
- **Minimize conflicts between water users in times of drought**
- **To enhance water quality through improved water and soil conservation practices**

By assisting with cost-share of water meters with the WSF grant and with implementation of conservation practices and additional water meters with the RCPP grant, multiple benefits will be realized. Not only will addressing these resource concerns benefit the agricultural industry taking part in the project, but communities within the LENRD will also reap the benefits of sustained and improved resources. These concerns include: water quantity, water quality, soil health, drought, and at-risk species habitat.

The first resource benefits of this project include water quantity and water quality, as well as drought mitigation. The LENRD has identified areas that experience significant aquifer declines in times of drought; these declines are exacerbated during periods of heavy groundwater irrigation. Spring depth-to-groundwater measurements performed by the LENRD following 2012 revealed that 242 of the 245 wells (99%) measured were lower than in the previous spring, that groundwater in 18% of the wells were at all-time low levels, and that 66% of the wells showed the largest one-year decline on record. During 2012, the LENRD received over 130 complaints from well owners that reported low or no water pressure from their private wells during the irrigation season. The LENRD created a cost-share program to help the well owners with well repairs, and between the well owners and the LENRD, over \$500,000 was spent to correct these problems where they were correctable. Water quality is also a resource concern as portions of the LENRD have been negatively impacted due to leaching of excess nitrate from numerous sources of nitrogen.

The LENRD provides habitat for two at-risk species identified by the Nebraska Game and Parks Commission- the Western Prairie Fringed Orchid and the Topeka Shiner. The Western Prairie Fringed Orchid is found in wetland areas located in the LENRD. However, as water quantity becomes scarce and the wetlands diminish, critical habitat is lost. To protect this critical habitat, the goal of the LENRD is to maintain and potentially increase the size of its wetland areas. The Topeka Shiner, which inhabits Taylor Creek in the LENRD, is also affected by water quantity issues. As water quantity diminishes, habitat is lost. With less water in the creek, water temperatures also rise, compromising the remaining habitat of the Topeka Shiner. By addressing water quantity issues, the LENRD can provide benefits to these habitat issues.

The LENRD also recognizes that agricultural practices that will be promoted as part of the larger RCPP project, particularly enhanced tillage practices, impact the quality of soil and decrease the rate of soil erosion which will positively impact water quality and quantity. Additionally, through the implementation of additional groundwater management actions such as allocations, when necessary, well conflicts will be reduced which will avoid future costs incurred by the LENRD and well owners, which totaled \$500,000 after the 2012 drought.

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.

This project will directly maximize the beneficial use of Nebraska’s groundwater resources. By providing information on agricultural producers’ water usage rate, the probable outcomes of this project are a reduction in agricultural water use and a better system of groundwater management. Agricultural producers will maximize their beneficial use of groundwater since they will have accurate water use data upon which to base their decisions on water applications. As was exemplified in the Republican River Basin, when water meters were required, the beneficial use of groundwater was maximized because the producers learned how to increase yield with less. Using the logo of the Water For Food Institute, the producers learned to produce “more crops per drop”. By receiving accurate water use reports from the agricultural producers across the district, the LENRD will be able to manage water use in a manner that achieves and sustains a balance between water uses and water supplies. This will provide benefits to the inhabitants of the LENRD, by maintaining adequate groundwater and surface water supplies thus minimizing water conflicts between the state’s residents.

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.

This project is cost-effective because it is an excellent example of a public/private partnership that leverages public dollars to support a private investment. For every publically funded \$500 in cost-share, the private well-owner will pay the remaining \$1,300 to \$2,500 in capital cost along with the installation and operation fees.

This Water Sustainability Fund (WSF) application for \$1.5 million is part of a larger project with an additional \$1.5 million that has been applied for through the Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program (RCP). Understanding that the program requirements of RCP limit the amount of money that can be used for capital costs, this WSF grant is being requested to cover the cost of the additional 3,000 water meter cost-share grants for \$500 each. The \$1.5 million NRCS RCP grant includes a limited number of cost-share grants (only 368 meters) but maximizes the additional aspects of water and soil conservation practices that can be funded through the NRCS program. Additionally, the RCP grant includes partnerships with the water meter and other water management technology manufacturers. McCrometer has committed to providing \$40,000 of in-kind contributions through educational programs to ensure that the water meters are installed, operated, and read properly. Other partners include AquaSpy for \$15,000, AgSense for \$7,500 and AquaCheck, CropMetrics, Central Valley Ag Cooperative, FieldWise, Green Line Equipment, Hortau, and Northeast Community College each for under

\$5,000. This commitment to provide education will directly benefit this project since the education program will be made available to all that participate in the cost-share program, regardless of whether the funding was from the RCPP or WSF.

Finally, the project is cost-effective because even a minor reduction in agricultural water use equates to a substantial savings. For example, if there were an annual 1% reduction in agricultural water use, according to Nebraska Department of Natural Resources records, that would equate to approximately 1,383 acre feet in groundwater use reduction on average for each of the last 25 years (<http://data.dnr.ne.gov/insight/>). The price of water varies across the country but ranges from \$50 to \$2,500 per acre foot. Using the lowest estimate of \$50 per acre foot for 25 years, the benefit would be \$1.72 million. Thus, using a very conservative estimate, the benefit of this project outweighs the cost.

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.

There are no interstate compacts, decrees or state contracts or agreements in the Lower Platte Basin. However, there are three federally listed endangered species in the Lower Platte Basin that are protected under the Endangered Species Act of 1973:

- Pallid Sturgeon
- Piping Plover
- Interior Least Tern

Additionally, within the LENRD, there are two at-risk species identified by the Nebraska Game and Parks Commission:

- Western Prairie Fringed Orchid
- Topeka Shiner

The proposed project will help with water conservation which will have a positive cumulative impact on stream flow by minimizing aquifer depletion. By reducing pumping, agricultural pumping impacts to streamflow will be diminished, specifically within the hydrologically connected areas within the LENRD. The impacts will be maximized in areas with the highest stream flow depletion factor (SDF) as defined by the Nebraska Department of Natural Resources Streamflow Depletion Factor (SDF) analysis along the Elkhorn and Logan Creek. Current and

potential future deficiencies in flow within the Lower Platte River corridor will negatively impact the habitats for these three endangered and two at-risk species.

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 United 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 groundwater supply in the LENRD is vital to the state of Nebraska and the United States of America. Currently the High Plains aquifer supplies water to 25% of the agricultural production in the US and without this supply there would be a debilitating effect on public security, public health and safety. As an example of the concern, the United States Department of Homeland Security’s Office of Cyber and Infrastructure Analysis recently released a report entitled Analysis of High Plains Resource Risk and Economic Impacts¹² which analyzed how continued depletions of the High Plains aquifer in Kansas and Nebraska might impact critical infrastructure and the economy at the local, regional, and national levels. In the introduction, the threat is described as follows, “The area overlying the High Plains Aquifer is one of the most prolific agricultural regions in the Nation, covering 111.8 million acres (175,000 square miles) in parts of eight States—Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. Following World War II, improved pumps and center pivot irrigation technology made High Plains groundwater available for large-scale irrigated agriculture. The High Plains has since become one of the most intensively irrigated areas in the United States, accounting for about 30 percent of all groundwater withdrawn for irrigation. As of 2007, the High Plains supported 50 million acres of cropland, 15.4 million acres of which were irrigated. The High Plains supplies approximately one-fourth of the Nation’s agricultural production. Associated crops provide significant amounts of feed to the Midwest cattle operations that account for 40 percent of U.S. feedlot beef output. The aquifer also provides drinking water to 82 percent of the people who live within its boundaries. Increasing reliance on the High Plains aquifer has exceeded groundwater recharge rates. Water-level declines began in parts of the High Plains Aquifer soon after the onset of substantial irrigation, around 1950; by 1980,

¹² Office of Cyber and Infrastructure Analysis, 2015, Analysis of High Plains Resource Risk and Economic Impacts, August 2015, Department of Homeland Security, National Protection and Programs Directorate.

water levels had declined by more than 100 feet in parts of Texas, Oklahoma, and southwestern Kansas.”

A key finding of this report is that “(i)f current water use practices are continued into the future, sixty counties in Kansas and seven in Nebraska are projected to face exhaustion of groundwater supplies in 100 years or less.” It is clear that water use practices will need to be carefully managed to ensure that groundwater is available in the future. This clear benefit to public security, public health and safety will be provided by the cost-share project as it will provide accurate information on the current status of groundwater use across the district allowing the LENRD to make well-informed water management decisions in the future.

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.

The LENRD is home to 89,256 residents, 45 communities across 2,526,700 acres and the area continues to be affected by high levels of nitrates in the groundwater. In the recently completed Water Inventory Report for the LENRD, Table 1 provides the types of groundwater usage by quantifying the number and type of registered wells in the district:

Table 1. Registered Wells in the LENRD in 2015.

Registered Well Type	Number of Active Wells Registered in 2015
Irrigation	5,584
Industry/Commercial	100
Monitoring	1,522
Domestic	2,039
Livestock	608
Observation	52
Ground Heat Exchanger Well	137
Recovery	127

Registered Well Type	Number of Active Wells Registered in 2015
Injection	90
Other	433
Total Wells	10,692

For the industrial, domestic and recreational water users, groundwater with elevated nitrate levels are a significant issue. Specifically, high nitrates can cause problems for process water in food production and processing plants, can require residential well owners to install expensive water treatment systems, and can cause increased toxic algal blooms in reservoirs and lakes.

In 1997, the LENRD created a Groundwater Management Area in a portion of Pierce County due to the presence of nitrates in groundwater that exceeded the Maximum Contaminant Level (MCL). The area was later expanded and now includes an area across four adjacent Natural Resources Districts (NRDs). In addition to the Bazile Creek Management Area, as it is now called, nitrate contamination has affected numerous communities within the LENRD. Some of the affected communities have received Administrative Orders from the state regulatory agencies due to the persistent presence of nitrate in regular sampling events.

In the Bazile Creek Groundwater Management Area, a groundwater management plan¹³ was approved in October 2014 that included numerous actions and tasks including:

- **User Education**
 - a. *Prepare bi-annual mailings explaining the groundwater concerns, best management practices (BMPs), cost share programs, etc.*
 - b. *Issue periodic news releases*
 - c. *Hold a minimum of three meetings, workshops or seminars to further educate producers*
 - d. *Initiate one-to-one contact with producers to facilitate the implementation or further implementation of BMPs*
 - e. *Educate communities in the area on the benefits of wellhead protection management planning*
- **Soil Sampling**
 - a. *Require annual soil sampling for any crop (including turf grass) where >50 lbs per acre per year of organic or inorganic nitrogen will be applied.*

¹³ Upper Elkhorn Natural Resources District, Bazile Creek Groundwater Management Plan Area, prepared jointly by Nebraska Department of Environmental Quality, Lewis and Clark Natural Resources District, Lower Elkhorn Natural Resources District, Lower Niobrara Natural Resources District, and the Upper Elkhorn Natural Resources District.

- i. Each sample will only be representative of 40 acres*
 - ii. Sampling depths will be 0-8" and 8"- 24"*
 - iii. Producers are encouraged to sample 24"- 48"*
 - b. Each soil sample must include a cation exchange capacity and organic matter analysis*
 - c. It is recommended NRDs provide cost share*
- ***Irrigation Water Sampling***
 - a. Irrigation water will be sampled every other year in line with the NRDs groundwater monitoring schedules*
 - i. Irrigation water users are encouraged to sample water annually*
 - b. It is recommended NRDs provide cost share*
- ***Water Well Flow Meters***
 - a. Each operator is required to have at least one irrigation system flow meter installed*
 - b. Larger operations (>10 systems) will be required to have at least one meter installed per 10 existing systems (i.e. 11 systems will require two flow meters)*
 - c. All new and replacement wells will be required to install a flow meter*
 - d. Meters must be installed within five years of plan approval*
 - e. NRDs will develop a meter inspection program to ensure flow meters are maintained in good working order*
- ***Soil Moisture Sensors and Irrigation Scheduling***
 - a. Each operator is required to install and utilize at least one soil moisture sensor for irrigation scheduling*
 - b. Larger operations (>10 irrigation systems) will be required to have installed and used at least one soil moisture sensor per 10 wells (i.e. eleven systems will require two sensors)*
 - c. Implementation should be completed within five years of plan approval*
- ***Fall Fertilizer Application***
 - a. No nitrogen fertilizer (organic or inorganic) shall be applied between post-harvest and November 1.*
 - b. Surface applied organic nutrients will be exempted from this if the application is in compliance with future cropping needs and a nutrient management plan.*
- ***Winter Application***
 - a. Nitrogen fertilizer applications to frozen or snow covered ground will not be allowed without district permission*
- ***Manure Applications***
 - a. All manure applied will be based on a nutrient analysis*
 - b. Require applicator to uniformly apply organic nutrients.*
 - c. Application equipment should be maintained and calibrated*
- ***Crop Tissue Analysis***
 - a. Each producer will be required to complete one growing season tissue analysis and one late season stalk nitrate test within five years of the plan approval*

- **Split Fertilizer Applications**
 - a. *Split application of nitrogen fertilizer will be required where the soil cation exchange capacity is <10 mg/l.*
 - b. *In soil types where the cation exchange capacity is >10 mg/l, one-to-one contact with producers should be undertaken to increase split applications on 50% of the BGMA*
- **Fertilizer application through irrigation system (fertigation)**
 - a. *Work with producers to achieve 90% of corn producers utilizing fertigation*
 - b. *NRDs are encouraged to provide cost share*
- **Nitrification Inhibitors**
 - a. *Encourage the use of nitrification inhibitors through education*
- **Variable application and precision farming**
 - a. *Create a partnership with local fertilizer distributors and crop consultants to create demonstration field(s)*
 - b. *Demonstrations will include nitrification inhibitors; growing season tissue analysis and late season stalk nitrate test*
 - c. *Demonstration fields will incorporate multiple BMPs including no-till, cover crops, etc.*
- **Nitrogen Budgeting/Accounting**
 - a. *Require producers to document nitrogen requirements and usage for all fields where >50lbs per acre of nitrogen is applied.*
 - b. *NRDs are encouraged to utilize a common reporting form or other form that contains the required information*
- **Sub-surface Irrigation**
 - a. *Work with a sub-surface irrigation system distributor to establish one demonstration field that includes the usage of a fertigation system*
- **Irrigation Well Rehabilitation**
 - a. *Implement water well construction standards that protect confined layers*
 - b. *Work with the Nebraska Water Well Standards Board to conduct a well rehabilitation demonstration.*
- **Vadose Zone Sampling**
 - a. *The NRDs will establish baseline vadose zone nitrate conditions and conduct periodic reassessments including the 10 and 20 year time frame*
- **Urban BMP Demonstrations**
 - a. *Develop urban demonstration and education sites*
 - b. *Demonstration should include multiple applicable BMPs including rain gardens, rain barrels, tree box filters, vegetated swales, etc.*
- **Areas of Significant Concerns**
 - a. *The NRDs will monitor the progress of the actions and tasks undertaken and where necessary increased management will be undertaken which may include regulatory actions.*

The fourth action item in the plan included the requirement to install a flow meter. This requirement has now been put into effect district-wide and this grant application will support implementation of the program. Nitrate issues are a persistent problem that recognition of the results of these measures will take time to be realized. As an example, in the Central Platte NRD, a study completed by the University of Nebraska identified that nitrates had been increasing at a rate of 0.5 ppm annually with an average concentration of 19.24 ppm in 1987. Following implementation of their groundwater management plan's regulations, the average nitrate levels gradually decreased to approximately 15.05 ppm by 2012 (Central Platte Natural Resources District, 2014¹⁴ and Exner, et al, 2010¹⁵).

This Water Sustainability Fund grant application is to fund a cost-share of \$500 for up to 3,000 water meters. This is part of a larger project through the NRCS RCPP that will include support of the groundwater and soil conservation practices. The water and soil conservation programs the LENRD intends to implement with these two grants should make a significant impact on water quality as was shown in the CPNRD.

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.

The local jurisdiction that supports the Water and Soil Conservation Project is the LENRD. The LENRD has and will continue to support the proposed project through their tax levy authority. LENRD fiscal year 2016 budget provides for a property tax requirement of \$4,224,679. The final levy has been set at 0.024061 cents per \$100 actual valuation.

This Water Sustainability (WSF) application for \$1.5 million is part of a larger project with an additional \$1.5 million that has been applied for through the Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program (RCPP). Understanding that the program requirements of RCPP limit the amount of money that can be used for capital costs, this WSF grant is being requested to cover the cost of the additional 3,000 water meter cost-share grants for \$500 each. The \$1.5 million NRCS RCPP grant includes a limited number of cost-share grants (only 368 meters) but maximizes the additional aspects of water and soil conservation practices that can be funded through the NRCS program. Additionally, the RCPP grant includes partnerships with the water meter and other water management technology manufacturers.

¹⁴ Central Platte Natural Resources District, 2014, Groundwater Quality Management Program, Central Platte Natural Resources District, <http://www.cpnrd.org/GWMP.html>

¹⁵ Exner, M.E., Perea-Estrada, H., Spalding, R.F., 2010, Long-Term Response of Groundwater Nitrate Concentrations

McCrometer has committed to providing \$40,000 of in-kind contributions through education programs to ensure that the water meters are installed, operated, and read properly. Other partners include AquaSpy for \$15,000, AgSense for \$7,500 and AquaCheck, CropMetrics, Central Valley Ag Cooperative, FieldWise, Green Line Equipment, Hortau, and Northeast Community College each for under \$5,000. This commitment to provide education will directly benefit this project since the education program will be made available to all that participate in the cost-share program, regardless of whether the funding was from the RCPP or WSF. Additionally, the RCPP grant application includes \$252,122.35 from the Nebraska Soil and Water Conservation Program in 2016 and \$1,000 in support from the Northeast Community College.

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 local jurisdiction that supports the Water and Soil Conservation Project is the LENRD. This project is proposed to assist with implementation of the requirements in their Groundwater Management Plan¹⁶ (GMP) and draft voluntary Integrated Management Plan¹⁷ (IMP). Both the GMP and the IMP were developed under the authority granted through the Groundwater Management and Protection Act (GMPA) and both have the overarching intent to plan for and maintain water sustainability across the entire LENRD.

The LENRD is well qualified and has plans in place to carry out this project. Their staff have extensive expertise in managing cost-share programs such as proposed in this application. They have successfully implemented numerous cost-share programs in accordance with the Natural Resources Conservation Service (NRCS) federal requirements. Most recently they successfully implemented a flow meter cost-share program in Pierce County to help address the water quality issues in the Bazile Creek area. The proposed Water and Soil Conservation Project will support sustainable water use for the largest water user – agriculture, across the entire 2,526,700 acre district. There are currently 5,584

¹⁶ Lower Elkhorn Natural Resources District, 2015, Groundwater Management Plan, 2015 Revision.

¹⁷ Lower Elkhorn Natural Resources District, 2015, Draft Integrated Management Plan, in progress.

registered irrigation wells in the district and this cost-share program will provide assistance for up to 3,000 installations.

The stakeholders involved in development of the goals and objectives of the most recently completed draft IMP are listed in Table 2.

Table 2 LENRD Voluntary IMP Stakeholder Advisory Committee

First Name	Last Name	Affiliation
Lalene	Bates	Stanton County
Kurt	Bogner	Nucor Steel
Jane	Daberkow	Domestic Well User – Madison Area
Ron	Dierking	Logan East RWS
Chuck	Folken	Agricultural Producer
Roger	Gustafson	LENRD
Larry	Haase	Domestic Well User – Wayne Area
Chuck	Hamernik	City of Clarkson
Duane	Hovorka	Environmental/Recreational - NE Wildlife Federation
Larry	Howard	UNL – Extension
Lowell	Johnson	City of Wayne
Jan	Jorgensen	Other
Dave	Kathol	Domestic Well User
Steve	Keck	Agriculture – Plainview Area
Bill	Kranz	UNL – Agricultural Research
Bob	Moseman	Agricultural Producer
Tom	Nathan	Agricultural Producer
Mike	Salmon	Salmon Well Co.
Dean	Stueckrath	Agricultural Producer
Robin	Sutherland	National Resources Conservation Service
Shane	Weidner	City of Norfolk
Tom	Welstead	Nebraska Game and Parks Commission
Rick	Wilson	United States Geological Survey

* This list only includes those attendees present at one or more meetings.

All 89,256 residents of the LENRD will both directly and indirectly benefit from this WSF and the associated RCPP project. By receiving accurate water use reports from the agricultural producers across the district, the LENRD will be able to manage water use in a manner that achieves and sustains a balance between water uses and water supplies. This will provide environmental benefits to the inhabitants of the LENRD by maintaining adequate groundwater and surface

water supplies for their use and minimizing conflicts between water users in the future.

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.

Water sustainability is a state wide issue. This project will directly and indirectly affect all 89,256 residents of the LENRD which will support addressing the statewide issue of sustainability. By receiving accurate water use reports from the agricultural producers across the district, the LENRD will be able to manage water use in a manner that achieves and sustains a balance between water uses and water supplies. This will provide environmental benefits to the inhabitants of the state of Nebraska by maintaining adequate groundwater and surface water supplies for their use.

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.

The LENRD Water and Soil Conservation Project is an excellent example of a local entity's ability to leverage state dollars with local and federal partners to maximize the use of all available resources. The LENRD will pay 40% of the Water Sustainability Fund project cost, thereby contributing \$600,000 to the project. This funding source is made available through the budget of the LENRD, which is provided through their tax levy authority. Attached is a copy of the LENRD budget summary showing their commitment to the project in highlighted line item 36. There is also a letter documenting the LENRD's intent to include the appropriate matching funds in their budgets for fiscal year 2016. Therefore, there is no need to contemplate how the project will proceed if they do not come through with their funding.

This Water Sustainability Fund (WSF) application for \$1.5 million is part of a larger project with an additional \$1.5 million that has been applied for through the Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program (RCPP). Understanding that the program requirements of RCPP limit the amount of money that can be used for capital costs, this WSF grant is being requested to cover the cost of the additional 3,000 water meter cost-share grants for \$500 each. The additional \$1.5 million NRCS RCPP grant includes a limited number of cost-share grants (only 368 meters) but maximizes the additional aspects of water and soil conservation practices that can be funded through the NRCS program. Additionally, the RCPP grant includes partnerships with the water meter and other water management technology manufacturers. McCrometer has committed to providing \$40,000 of in-kind contributions through education programs to ensure that the water meters are installed, operated, and read properly. Other partners include AquaSpy for \$15,000, AgSense for \$7,500 and AquaCheck, CropMetrics, Central Valley Ag Cooperative, FieldWise, Green Line Equipment, Hortau, and Northeast Community College each for under \$5,000. This commitment to provide education will directly benefit this project since the education program will be made available to all that participate in the cost-share program, regardless of whether the funding was from the RCPP or WSF. Additionally, the RCPP grant application includes \$252,122.35 from the Nebraska Soil and Water Conservation Program in 2016 and \$1,000 in support from the Northeast Community College. A copy of these commitment letters is provided in Attachment C.

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.](#)

The main objective of the proposed project is to improve conservation of water and soil within the LENRD. The LENRD is charged by the state of Nebraska with protecting natural resources within the LENRD's boundaries. In the course of fulfilling its responsibilities, the LENRD has identified a variety of concerns, many related to the agricultural industry found in Northeast Nebraska. Not only will addressing these resource concerns benefit the agricultural industry taking part in the project, but communities within the LENRD will also reap the benefits of sustained and improved resources. These concerns include: water quantity, water quality, soil health, drought, at-risk species habitat, and air quality. While the primary and secondary objectives of the project focus on water and soil resources, practices implemented by the project to improve quantity and quality of water and soil will have additional benefits that address other resource concerns and improve watershed function.

The first resource benefits of this project include water quantity and water quality, as well as drought mitigation. The LENRD has identified areas that

experience significant aquifer declines in times of drought; these declines are exacerbated during periods of heavy groundwater irrigation. Spring depth-to-groundwater measurements performed by the LENRD following 2012 revealed that 242 of the 245 wells (99%) measured were lower than in the previous spring, that groundwater in 18% of the wells were at all-time low levels, and that 66% of the wells showed the largest one-year decline on record. During 2012, the LENRD received over 130 complaints from well owners that reported low or no water pressure from their private wells during the irrigation season. The LENRD created a cost-share program to help the well owners with well repairs, and between the well owners and the LENRD, over \$500,000 was spent to correct these problems where they were correctable. Water quality is also a resource concern as portions of the LENRD have been negatively impacted due to leaching of excess nitrate from numerous sources of nitrogen.

The first resource concerns identified by the LENRD, water quantity and water quality, as well as drought, have been identified by current groundwater monitoring practices. By monitoring irrigation wells and dedicated monitoring wells (wells specifically designed to measure water levels and test water quality), the LENRD has identified areas with decreased water levels in times of drought, as well as decreased water levels during periods of heavy groundwater irrigation. Both of these concerns to water quantity and quality impose challenges as the LENRD works to maintain or improve watershed function.

The LENRD also recognizes that agricultural practices, particularly practices such as tillage, impact the quality of soil and increase the rate of soil erosion. The LENRD promotes, and will continue to promote, the use of Natural Resources Conservation Service (NRCS) recognized practices that contribute to increased soil quality and decrease soil erosion. Furthermore, the LENRD provides habitat for two at-risk species identified by the Nebraska Game and Parks Commission—the Western Prairie Fringed Orchid and the Topeka Shiner. The Western Prairie Fringed Orchid is found in wetland areas located in the LENRD. However, as water quantity becomes scarce and the wetlands diminish, critical habitat is lost. To protect this critical habitat, the goal of the LENRD is to maintain and potentially increase the size of its wetland areas. The Topeka Shiner, which inhabits Taylor Creek in the LENRD, is also affected by water quantity issues. As water quantity diminishes, habitat is lost. With less water in the creek, water temperatures also rise, compromising the remaining habitat of the Topeka Shiner. By addressing water quantity issues, the LENRD can also address these habitat issues.

Habitat preservation and sustainable water use will positively affect watershed function in the LENRD. By implementing this cost-share program to assist with the installation of water meters, the probable environmental and ecological consequences of this project are positive with a reduction in agricultural water use and a better system of groundwater management. The reduction in water use will come as agricultural producers have accurate water use data upon which

to base their decisions on water applications. By receiving accurate water use reports from the agricultural producers across the district, the LENRD will be able to manage water use in a manner that achieves and sustains a balance between water uses and water supplies. This will provide environmental benefits to the inhabitants of the LENRD--human, plant and animal--by maintaining a functional watershed that provides adequate groundwater and surface water supplies for their use.

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.

In the Nebraska Department of Natural Resources' (NDNR) 2015 Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process ¹⁸ there are at least three objectives that this project will directly address.

*Page 11. "Voluntary Water Use Reporting
In conjunction with a number of NRD's initiating voluntary integrated management plans, the Department requested voluntary online water use reporting from permit holders in the Loup, Niobrara, and Lower Platte river basins. This online survey tool will help us better assess current water use, project future water needs and enhance management, and oversight of surface water throughout our state."*

The LENRD is currently working on an online reporting tool for producers to report their annual water use as recorded by flow meters. Additionally, online reporting tools will be developed for producers to submit annual Irrigation Water Management (IWM) reports. The LENRD will use the electronic data to analyze the most effective conservation practices. The data will be made available to producers and the LENRD believes that providing evidence to producers will encourage more widespread use of IWM and other conservation practices. The data will also be made available to the NDNR in support of their objective to assess current water use as described on page 11 of the plan.

*Page 15. "CENEB—Central Nebraska Model
The Central Nebraska Model (CENEB) is a regional model that encompasses portions of the Loup and Elkhorn River Basins, which are tributaries to the Lower Platte River Basin. Model construction was*

¹⁸ Nebraska Department of Natural Resources, 2015, Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process, Submitted to the Governor and Legislature by the Director of the Nebraska Department of Natural Resources.

completed by the Department and consultants in July, 2013. The Department's new INSIGHT methodology utilized this model to evaluate portions of the Niobrara and Elkhorn River basins, as well as the entire Loup River Basin. The CENEb model is available to NRDs to evaluate management actions as a part of IMP implementation."

Currently, the CENEb model estimates groundwater use by agricultural producers. Since this is the largest water use in the model, even small inaccuracies in the estimate can make a large difference in the overall water budget. The annual reports of water use based on actual measurements from flow meters will provide more accurate data to use in the CENEb model.

Page 16 and 17. "In 2015, the Upper Elkhorn NRD contacted the Department to state its intent to jointly develop a voluntary [Integrated Management Plan] IMP. As such the Department will work with this NRD to develop and implement a voluntary IMP over the next one to two years. The Department will continue its current work with the Lower Platte South and Papio-Missouri NRDs to implement their respective voluntary IMPs and regularly assess progress being made toward the goals of these plans. The Department will also work with the Lower Elkhorn and Lower Platte North NRDs to continue development of these voluntary IMPs with the goal of having both plans adopted by December 2015. Upon adoption, the Department will work with each NRD to implement actions and regularly assess progress made toward meeting the goals identified in each plan. The efforts of all local voluntary IMPs will be supported through the Lower Platte River basin-wide planning efforts. The Department will continue to work with the NRDs in developing a basin-wide plan for the Lower Platte River Basin."

This project directly addresses the second objective of the first goal in the voluntary IMP currently being developed in collaboration with the NDNR. The first goal is designed to provide valuable water supply and water use information to the LENRD and NDNR. The second objective under this goal is to develop and maintain a comprehensive database of the location and source of the basin's water uses. The draft IMP states that in addition to an understanding of water supplies, an understanding of water uses is equally important. By providing financial assistance to producers to install flow meters on irrigation wells, the district will gain valuable information on water use of its largest water user. The plan will be approved and implemented by the LENRD and NDNR in early 2016. It is noteworthy that the LENRD has moved forward on accomplishing these goals and objectives even before the plan is officially adopted. This illustrates the LENRD's commitment to reaching the goal of water sustainability and through their efforts it helps the NDNR achieve the objectives of the 2015 Annual Report earlier than anticipated.

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.

N/A

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.

The citizens of the Lower Elkhorn Natural Resources District (LENRD) depend on abundant, clean water in their homes for domestic use, on their farms for agricultural production, and for their industries to maintain economic viability. Wildlife that live and migrate through the LENRD depend on clean water for sustenance and habitat. Furthermore, human inhabitants of the LENRD use water in rivers and lakes for recreation including fishing, hunting, boating, and swimming.

Both rural and urban inhabitants along the Elkhorn River have relied on the abundant water resources of the area and over time their water use has increased. During the drought of 2012, the water resources were severely stressed and the results were dramatic. Heavy irrigation during the very hot and dry conditions in late 2012 caused groundwater declines in 99% of the monitoring wells and 66% of the wells showed the largest one-year decline on record. Over 130 complaints were received at the NRD from well owners that reported low or no water pressure from their private wells during the irrigation season.

Following the drought of 2012, it was clear to leaders at the LENRD and citizen stakeholders that water planning needed to be initiated to provide a framework for how to sustainably manage their water resources. Since that time, several actions have been taken to mitigate the immediate issues and implement changes to water management. This grant application, to provide funding to cost-share on the installation of water meters for all irrigation wells in the district, is a critical component of the actions taken by the LENRD.

To illustrate the level of commitment by the LENRD to sustainably manage their water resources, the following actions have taken place:

- **In late 2012 and into 2013, the LENRD funded a cost-share program to help well owners with well repairs to address the water access issues. Over \$500,000 of work was completed to correct these problems, where appropriate.**
- **In 2014, the LENRD voluntarily developed a Water Inventory Report¹⁹ and a water balance study to document the current understanding of the District's water supplies and demands.**

¹⁹ Olsson Associates, 2015, Water Inventory Report for the Lower Elkhorn Natural Resources District.

- In 2014 and 2015, a draft Integrated Management Plan²⁰ (IMP) was developed in collaboration with the Nebraska Department of Natural Resources (NDNR) with extensive local stakeholder involvement.
- In 2015, a significant change to the Groundwater Management Plan²¹ (GMP), Rules and Regulations was approved by the Board of Directors. The changes included a requirement for all irrigation wells to install water meters in order to better document the demands for groundwater by agricultural water users.
- In 2015, the LENRD applied for a Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program (RCPP) grant to fund a comprehensive conservation practices to address groundwater quality and quantity uses.

The nature and purpose of this project is straight forward. There are currently 5,584 active registered irrigation wells in the district with roughly 1,000 flow meters already installed. The \$1.5 million will be used to provide a cost-share of \$500 toward the purchase price of up to 3,000 water meters in the LENRD. The RCPP grant will cover an additional 368 flow meters along with significant education, nutrient management water and soil conservation practices. It is anticipated that approximately 20% of producers will chose not to participate in the program and will purchase the required water meters on their own.

The objectives of the cost-share program are as follows:

- To provide financial assistance to participating producers to comply with the new groundwater management requirements.
- To provide accurate data for annual water use reports submitted by producers in the LENRD.
- To provide agricultural water use data for groundwater models including both the Central Nebraska (CENEB) Model and the Elkhorn Loup Model (ELM).
- To provide the LENRD with documentation of water use which will be critical in drought years when allocations or other management practices may be required.

Ultimately, the LENRD has initiated this cost-share project to better document the impact of agricultural water use on the water supplies in the district. Proper documentation of water use will enable the LENRD to enact appropriate water management rules and regulations to avoid the issues of wells drying up as seen in the drought of 2012. It will also provide accurate data that can be used in groundwater modeling to evaluate conjunctive water management projects developed to benefit the downstream water users in the Lower Platte Basin.

²⁰ Lower Elkhorn Natural Resources District, 2015, Draft Integrated Management Plan, in progress.

²¹ Lower Elkhorn Natural Resources District, 2015, Groundwater Management Plan, 2015 Revision.

This project is truly a public/private partnership where producers are paying approximately 80% of the purchase and 100% of the installation price for the water meters. The remaining 20% or \$500 for up to 3,000 water meters is funded with \$600,000 (40% match) provided by the LENRD, and the remaining \$900,000 (60%) through the Water Sustainability Fund (WSF). An additional \$1.5 million is being requested through the Federal NRCS RCPP grant to support additional water meters along with soil and water conservation practices that are protective of the natural resources in the LENRD. Therefore, with the commitment of \$900,000 from the WSF, \$600,000 through the LENRD, and an additional \$1.5 million through the NRCS RCPP, the LENRD will be able to take one significant step forward for water sustainability across the entire District.

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.

In early 2016, the LENRD staff will prepare the documentation required for application to the cost-share program. The LENRD Board of Directors will approve implementation of the program. Agricultural producers will have a two-year period to apply for the cost-share.

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.

The LENRD will be responsible for developing, implementing, and documenting the cost-share program. The LENRD is committing \$600,000 of the cost-share program to provide \$500 toward the purchase of up to 3,000 water meters.

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.

Along with the \$1.5 million outlined in this Water Sustainability Fund (WSF) application, an additional \$1.5 million has been applied for through the Natural Resources Conservation Service (NRCS) Regional Conservation Partnership Program (RCPP). The NRCS RCPP grant includes a similar cost-share program

for up to 368 meters and additional aspects of water and soil conservation practices. The grant includes partnerships with the water meter and other water management technology manufacturers. McCrometer has committed to providing \$40,000 of in-kind contributions through education programs to ensure that the water meters are installed, operated, and read properly. Other partners include AquaSpy for \$15,000, AgSense for \$7,500 and AquaCheck, CropMetrics, Central Valley Ag Cooperative, FieldWise, Green Line Equipment, Hortau, and Northeast Community College each for under \$5,000. This commitment to provide education will directly benefit this project since the education program will be made available to all that participate in the cost-share program, regardless of whether the funding was from the RCPP or WSF. Additionally, the RCPP grant application includes \$252,122.35 from the Nebraska Soil and Water Conservation Program in 2016 and \$1,000 in support from the Northeast Community College. If the RCPP grant is not funded, the LENRD has authorized \$1.9 million in support of the cost-share program in their 2016 budget should it be needed.

5. Support/Opposition

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

The LENRD presented the changes to their Groundwater Management Plan²² in a public hearing on October 15, 2015. During the hearing, the new rule to require flow meters on all irrigation wells was discussed and a request was made to pursue financial support through a cost-share program to help producers comply with this new mandate. Although the intent of the hearing was to hear testimony on the changes to the Groundwater Management Plan, there was no opposition to the proposal to initiate a cost-share program to provide financial assistance to producers that will be required to install water meters by January 2018.

²² Lower Elkhorn Natural Resources District, 2015, Groundwater Management Plan, 2015 Revision.