

Dorchester

# Lower Big Blue NRD - Groundwater Management for Sustainability

Big Blue River

Walnut Cr.

Crete

Presented by:



Presented to:



NATURAL  
RESOURCES  
COMMISSION



Nebraska  
Department of Natural Resources

Spring Cr.

Turkey Cr.

Water Sustainability Fund Application  
July 29, 2016

Wilber

**NEBRASKA NATURAL RESOURCES COMMISSION**

Water Sustainability Fund

Application for Funding

Section A.

**ADMINISTRATIVE**

**PROJECT NAME:** Lower Big Blue NRD - Groundwater Management for Sustainability

*PRIMARY CONTACT INFORMATION*

**Entity Name:** Lower Big Blue Natural Resources District (LBBNRD)

**Contact Name:** Scott Sobotka

**Address:** 805 Dorsey Street, PO Box 826, Beatrice, NE 68310

**Phone:** 402-228-3402

**Email:** sobotka@lbbnrd.net

Partners / Co-sponsors, if any: [Click here to enter text.](#)

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

Grant amount requested. \$180,000.00

Loan amount requested. \$ 0.00

If Loan, how many years repayment period? [Click here to enter text.](#)

If Loan, supply a complete year-by-year repayment schedule.  
[Click here to enter text.](#)

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

Nebraska Game & Parks Commission  
(G&P) consultation on Threatened and  
Endangered Species and their Habitat

N/A  Obtained: YES  NO

Surface Water Right

N/A  Obtained: YES  NO

USACE (e.g., 404 Permit)	N/A <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) Click here to enter text.	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. Click here to enter text.

If yes what is the population served by your project? Click here to enter text.

If yes provide a demonstration of need. Click here to enter text.

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

The LBBNRD has initiated the process to begin working with NDNR to develop a voluntary integrated management plan (Attachment A).

**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? Click here to enter text.

If yes, describe the changes that have been made since the last application. Click here to enter text.

No, I certify the application is a true and exact copy of the previously submitted and scored application. (Signature required) [Click here to enter text.](#)

**6. Complete the following if your project has or will commence prior to next July 1<sup>st</sup>.**

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? \$ 0.00

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

There are no expenses prior to July 1, 2017.

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 1<sup>st</sup> for which you are asking cost share assistance from this fund.

The LBBNRD intends to utilize funding from the WSF for flow meter cost share on or just after July 1, 2017, in order to coincide with the 2017 budget. The project will continue for three years or until 1,000 flow meters are installed under this program.



## 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);

By definition installation of a flow meter is considered 'installing equipment', however, a feasibility report is not necessary for this project. Since approval of the LBBNRD's new groundwater rules in March 2014, staff has been actively assessing the impacts of those revisions, as well as determining whether enough is being done to appropriately manage the sustainability of groundwater resources in the District. For two years, anyone seeking a permit for a new irrigation well has also been required to submit a test log for the proposed well. Using information from the test log, the University of Nebraska, the Nebraska Department of Natural Resources (NDNR), aerial imagery and any other pertinent sources of data, new well permits undergo a scoring process. This method provides the LBBNRD with a means of determining the likelihood and/or degree to which a new well might have detrimental effects to the surrounding groundwater users, and ultimately helps the LBBNRD determine whether or not to approve a given permit. Since the inception of the scoring system, 62 new and 37 replacement irrigation well permits have been approved while 86 have been denied, 13 by the Board and a total of 73 due to the new scoring system.

In addition to the scoring system, the LBBNRD implemented a 500-foot spacing requirement from domestic wells by which new and replacement irrigation wells must also abide. While the scoring system has helped to provide improved protection to existing groundwater users, particularly in areas of the District where aquifer formations are marginal, implementing additional management options has been considered. Furthermore, the LBBNRD bolstered its transfer policy to include limits on distance and acreage, as well as the maximum number of wells permitted to run in series (two) in order to provide water to an irrigation system.

It's impossible to accurately gauge the impacts of current practices on the District's groundwater resources without knowing what those practices entail. The LBBNRD has measured the static water levels of a network of wells since 1982 and has installed 40 new dedicated monitoring wells between 2015 and 2016. The LBBNRD Flow Meter Cost-Share Program has been in effect for almost 20 years, and during that time it is estimated that 15 to 20% of the District's 2,392 irrigation wells in the District have been outfitted with various types of flow meters. Additionally, since January 2011, all new and

replacement irrigation wells have been required to have flow meters installed. Pursuant to Chapter 8 of the District's updated Groundwater Rules and Regulations, groundwater withdrawal reporting is required if requested, which provides the data necessary to fully assess the state of groundwater quantity throughout the District or within a given sub-area of the District. Groundwater withdrawal reporting could potentially be required in the future.

In 2016, pursuant to Chapters 8 and 12 of those same rules and regulations, the LBBNRD had begun certification of groundwater use acres throughout the District. This applies to agricultural, municipal, and other groundwater users, and reports would be required by March 1st of a given year. On the farm level, using tools like water sensors, ET gages and soil moisture probes to better control irrigation scheduling can also have lasting positive effects on groundwater consumption besides improving the bottom line cost of producing a crop.

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

Based upon known issues with wells and complaints from well owners experiencing issues during heavy irrigation usage, the LBBNRD has mapped areas where these issues have occurred. These areas have not yet been formally recognized, but generally can be described as the fringe areas between aquifers that produce and those that are lacking the capability to produce. The LBBNRD maps areas with wells of concern. The communities of Clatonia, Harbine, and Tobias have reported issues with water quantity due to summer level declines.

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

The installation of flow meters is a relatively simple irrigation management practice that does not require a feasibility report, maps, drawings, charts, tables, etc.

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

There are no water or land rights required for this project.

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

Required geologic investigation (004.01 E 1);

A geologic investigation was not necessary for this project.

Required hydrologic data (004.01 E 2);

There is not a need for hydrologic data for this project.

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

All flow meters will be approved by the LBBNRD and are designed by the manufacturer. There is no additional design required for this project.

- 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);

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

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

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).

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

There are other methods that could be used to estimate water use which are nowhere near as effective as installing a permanent flow meter. One method involves the use of LBBNRD staff to measure flow using an ultrasonic flow meter. They are portable units that attach on the outside of a pipe that can determine the gallons per minute traveling through the system. Annual flow measurements of individual systems could be used in combination with estimated pumping times using measurements of electricity or fuel usage records or hour meters. These methods would require such extensive staff time and correspondence with producers that is has been deemed infeasible.

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 LBBNRD Flow Meter Cost-Share Program has been offering cost-share of up to 50% of the price of a new meter, or \$500, for the last 20-years. As part of this project, the LBBNRD will offer a cost-share of \$300 per meter. The LBBNRD will not be responsible for the cost of installation and maintenance, but LBBNRD staff will be responsible for inspecting the meter to ensure it was installed according to manufacturer's specifications before it is operated and before the producer receives cost-share. The LBBNRD staff will also use their ultra-sonic flow meter to help producers determine the accuracy of the flow meter if there is concern it isn't working properly. Costs related to meter inspection will be covered by the LBBNRD and are not included as part of this project. The total cost of this project is \$1,300,000, which includes the producer's contribution.

- 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).

The collection of data is necessary to make informed, defensible water management decisions that will lead to sustainability. While the nature of this project does not allow for a calculation of tangible benefits, the data will provide significant intangible benefits. The LBBNRD is seeking to improve its capability to record water consumption of individual agricultural producers in order to make future management decisions using definitive and scientific data. Water resources are currently measured using surface water stream gauges and a monitoring well network of 170 wells across the District (95 irrigation wells, 35 'compact' wells along the river, and 40 dedicated monitoring wells). There are an estimated 2,392 registered irrigation wells in the District, only 15-20% are estimated to currently be using water meters. Expanding the use of water meters will be a task under a future goal to be placed in the LBBNRD Integrated Management Plan (IMP) to support a water supply and use inventory based upon best available data.

- 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).



There are no tangible benefits, but the project will increase water sustainability. Information on total project cost is shown in the table below.

Funding Partner	Project Total	Year 1	Year 2	Year 3
WSF	\$180,000.00	\$60,000.00	\$60,000.00	\$60,000.00
LBBNRD	\$120,000.00	\$40,000.00	\$40,000.00	\$40,000.00
Producers	\$1,000,000.00	\$333,333.33	\$333,333.33	\$333,333.33
<b>TOTAL</b>	<b>\$1,300,000.00</b>	<b>\$433,333.33</b>	<b>\$433,333.33</b>	<b>\$433,333.33</b>
WSF-LBBNRD Share	\$300,000.00	\$100,000.00	\$100,000.00	\$100,000.00
# of Meters	1000	334	333	333

- 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).

Currently there is no standard measure of the value of water. The value is dependent upon its use and is highly debatable. What is certain is without a sustainable supply of groundwater, the economy will suffer, especially Nebraska’s agricultural economy. Since the drought of 2012, water supply has become an increasingly vocal issue within the District. Irrigation uses are competing with private, domestic and municipal wells. The drought also led to a spike in commodity prices creating a surge in ground converted to row crop, which led to increased irrigated acres in areas where groundwater supplies are marginal. It is expected that metering wells in the District will lead to greater efficiency and opportunity to better manage groundwater in the future, which will increase the quantity of groundwater throughout the District. Metering wells will be another educational tool that farmers can use to make sure they are using the water efficiently

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

Using a conservative estimate of \$1,300/meter, the project total for meters is \$1,300,000. The LBBNRD Board of Directors will budget \$40,000 per year for the Flow Meter Cost-Share Program in 2017-2019 for a total cash contribution of \$120,000, or 40% of the net local share. A total of \$180,000 is requested from the WSF, or 60% of the remaining net local share. A letter of financial commitment has been provided by the General Manager and is shown in Attachment B. Producers would be responsible for contributing the remaining \$1,000,000.

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.

There will be no impacts to the natural environment as a result of the installation of irrigation flow meters. The only anticipated impact is positive as a result of decreased consumption of groundwater supplies.

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

In 1972, the Nebraska Legislature created and declared that NRDs are essential to the health and welfare of the people of the State of Nebraska to conserve, protect, develop, and manage the state's natural resources. The LBBNRD has professional staff whose responsibility is solely to carry out those tasks given to NRDs by the Legislature. Staff are trained and well qualified to implement cost-share programs, inspect well meters, and provide technical assistance to producers. Furthermore, LBBNRD staff are fully capable of collecting and utilizing the water usage data and providing it in a format for the Board of Directors to use in water management decision making.

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

On December 19, 1985, the District's first Groundwater Management Plan (GMP) went into effect pursuant to the passage of Nebraska Revised Statute Chapter 46, Article 6, Section 73.01 enacted by the 88th Nebraska Legislature. Since that time the GMP has been amended twice to incorporate goals for groundwater quality. In 2013, the District began a process to update the GMP by adopting new rules and regulations, including placing the entire District into a Phase 1 designation for water quantity. This project will implement a key management practice identified in the GMP, as well as implement a key management action that will be identified in the IMP. The GMP was developed through the authority granted by the Groundwater Management and Protection Act, as will the IMP.

10. Are land rights necessary to complete your project?

YES  NO

If yes, provide a complete listing of all lands involved in the project.  
[Click here to enter text.](#)

If yes, attach proof of ownership for each easements, rights-of-way and fee title currently held.  
Click here to enter text.

If yes, provide assurance that you can hold or can acquire title to all lands not currently held.  
Click here to enter text.

11. Identify how you possess all necessary authority to undertake or participate in the project.

On July 1, 1972, the Legislature created Natural Resources Districts, in Chapter 2, Article 32, 2-3201. The NRDs are tasked with managing groundwater and hydrologically connected groundwater and surface water. Chapter 46, Article 7, 46-702 of the Groundwater Management and Protection Act states, "The Legislature also finds that natural resources districts have the legal authority to regulate certain activities and, except as otherwise specifically provided by statute, as local entities are the preferred regulators of activities which may contribute to ground water depletion."

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

Significant environmental and ecological impacts could result from this project all of which are positive. Data that facilitates the efficient and effective use of groundwater will ultimately result in increased quantities of water in local and regional aquifers and an improvement in groundwater quality as a result of reduced nitrate leaching.

## 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.

There are two specific threats to drinking water that will be addressed by this project including reducing pumping from aquifers that support domestic water supplies and reducing nitrate leaching into aquifers. Installation of water meters will improve irrigation

management, which will reduce overall irrigation pumping from aquifers that are used also for domestic and municipal water supplies. During summer months when irrigation usage is at its peak, the LBBNRD receives complaints from municipalities and from an estimated 20 private domestic well users. The communities of Clatonia, Harbine, and Tobias have documented water quantity issues due to summer declines in water levels. This issue affects hundreds of people annually and could become a much larger issue if another drought, like in 2012, occurs. Concerns with dropping water levels in domestic supply wells increased during and after the 2012 drought.

Nitrate contamination of aquifers is another growing threat which the LBBNRD Board is facing today. Between 2009 and 2015, 109,524 acres were converted to row crop (NASS 2016<sup>1</sup>) across the entire LBBNRD. The majority of the ground converted was from a grass or pasture cover to soybeans or corn, resulting in a significant increase in fertilizer use and irrigation. The combination of irrigation and row crop is a known source of nitrate contamination. Reducing infiltration through irrigation water management is a recommended best management practice and will be achieved through this project.

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.

While the LBBNRD monitors groundwater levels in the District to help determine sustainability, it had also received a growing number of reports about the reduced capacity or failure of several domestic and irrigation wells in the District. Due to concerns about the sustainability of groundwater supplies in the area, and under the authority of Nebraska Revised Statute 46-707 (2), the LBBNRD Board went into an immediate 180-day moratorium, or stay, on the construction of new wells designed to pump greater than 50 gallons per minute. The Board also discussed the increase of irrigated acres in the District at its monthly meeting on November 26, 2013. The primary purpose for the stay was to provide the LBBNRD with an opportunity to revise and implement its GMP. Specific management items under consideration by the LBBNRD included: sustainability of groundwater supplies in marginal aquifers, setbacks from domestic wells, commingled wells or the number of wells permitted to run in series, a scoring system for evaluating and determining whether the proposed location of a well is appropriate, certification of irrigated acres, and a water transfer policy. There is a possibility that meters will be required on all irrigation wells in the future.

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<sup>1</sup> United States Department of Agriculture. National Agricultural Statistics Services – CropScape – Cropland Data Layer. 2009 and 2015 land cover. Accessed July 18, 2016. [www.nassgeodata.gmu.edu/CropScape/](http://www.nassgeodata.gmu.edu/CropScape/)



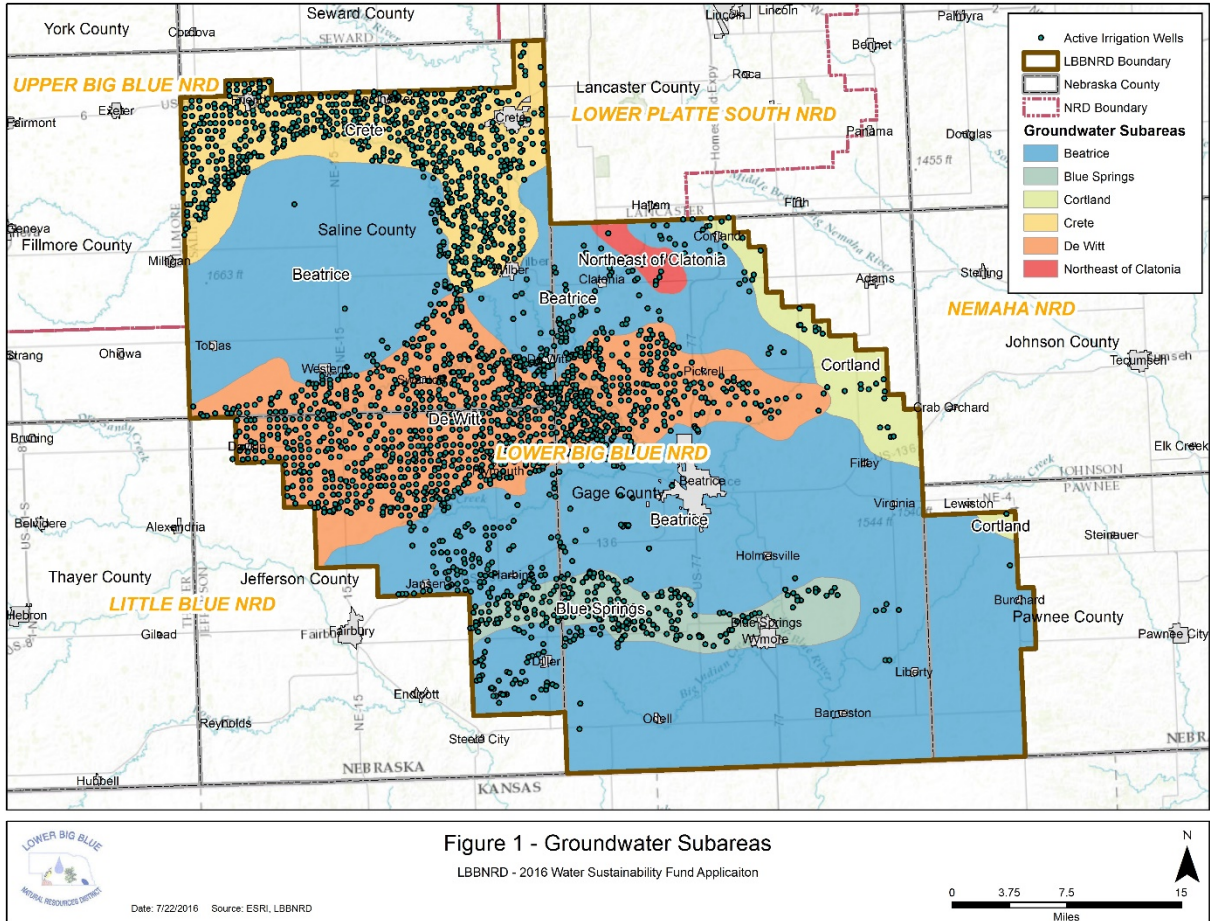
The LBBNRD has initiated the IMP process by mailing a letter to the NDNR after their July 28, 2016 Board meeting. One of the goals in the IMP will be to inventory and understand water uses in the LBBNRD, including irrigation. By providing incentives to producers to install water meters the LBBNRD will be taking action on achieving this goal and will have valuable information on the level of groundwater being consumed through irrigation.

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.

A combination of events, mainly the drought in 2012, has led the LBBNRD to where it stands today in regards to ensuring the District's aquifers are managed in a sustainable manner. The installation of water meters will be encouraged across the entire basin, although it is not yet required. There are three primary areas (Crete, DeWitt, and Blue Springs subareas) within the LBBNRD where efforts will likely be focused due to the presence of aquifers capable of supporting irrigation demands. There are areas of concern, particularly along the fringes of the primary aquifers, but these areas have not been identified as Phase II areas at the time of this application. The groundwater subareas are shown in Figure 1.



The 2016 Fully Appropriated Basin (FAB) report for the Blue River basin states that the analysis of lag effects of current development for areas in the Big Blue River Basin indicated a reduction in stream flow of 23 cfs has occurred in the past 25 years and that in the next 25 years another 3 cfs reduction is expected (NDNR 2016<sup>2</sup>). An estimate of the actual area and amount that the aquifer depletion will be reduced wasn't calculated for this application. However, it can be assumed that a reduction in groundwater pumping by high capacity irrigation wells that will result from the use of flow meters will reduce future aquifer depletions. Reduced aquifer depletions could also increase streamflow in areas of the LBBNRD that are hydrologically connected.

Cross basin benefits will occur by acquiring data that can be used for future groundwater modeling. The data gathered from water use reports would be very useful in calibration of the Big Blue Model, a regional model being developed by Upper Big Blue NRD. Water use data would be used to compare simulations to actual withdrawal information building integrity in the model.

<sup>2</sup> Nebraska Department of Natural Resources. December 2015. Annual Evaluation of Availability of Hydrologically Connected Water Supplies.

Additionally, by metering water use, the LBBNRD is better suited to enact future rules and regulations should they become necessary.

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.

There are several goals of this project that when implemented will help manage groundwater in a sustainable manner. These benefits will be realized by everyone in the basin, as well as wildlife. Without this project, the effective management of groundwater resources will be hindered and potential conflicts between water users will continue and most likely increase. The project's goals are listed below:

- The management of the quantity and quality of groundwater resources within the Big Blue River Basin will be enhanced through a comprehensive and collaborative well metering cost-share program and by implementing actions to restore and protect groundwater resources from degradation.
- The LBBNRD staff and Board of Directors will collaborate with agricultural producers to better understand the effects of human activities on water quantity and quality, and support actions to restore and protect resources from further degradation.
- The LBBNRD will provide \$300 cost-share per meter for a maximum of 1,000 meters from 2017-2019.
- The LBBNRD can obtain scientific based data on the quantity of groundwater pumped in order to better manage groundwater resources so that water conflicts between domestic users and irrigators will be minimized.

Long range benefits include a greater resistance to drought by providing a more sustainable water supply, minimizing human conflicts related to water use, and gaining knowledge of the importance of proper irrigation management.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;
  - Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
  - Describe the beneficial uses that will be reduced, if any.

- Describe how the project provides a beneficial impact to the state's residents.

The NRD's are responsible for managing the state's groundwater resources and this project supports that mission. This project also promotes sustainability through the efficient use of groundwater which will result in maximized beneficial uses relating to both quality and quantity. In addition to meeting critical data needs, working with producers on this project will also help foster relationships between local government and the agricultural sector. This project will not reduce beneficial uses in any way. This project will minimize conflicts that are currently occurring between domestic and agricultural water users. Minimizing or eliminating these conflicts will benefit every tax payer in the state so that these conflicts are not resolved legally, which would require state resources. Dealing with nitrate contamination in private and public water supplies comes at a significant cost to the residents of the state. Tools like irrigation water management result in reductions of nitrates in groundwater.

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.

There are no construction activities or costs associated with this project. The current cost of a water meter is approximately \$1,300. While they are installed by the producer or their contractor all work is inspected by qualified LBBNRD staff to ensure they are installed properly and in perfect working condition. The LBBNRD will provide \$300 in cost-share per meter and will inspect the meter at no additional cost to the producer. A cap of 1,000 meters has been set resulting in a total cost of \$1,300,000. Proposed funding amounts and sources are provided in the table below.

Funding Partner	Project Total	Year 1	Year 2	Year 3
<b>WSF</b>	\$180,000.00	\$60,000.00	\$60,000.00	\$60,000.00
<b>LBBNRD</b>	\$120,000.00	\$40,000.00	\$40,000.00	\$40,000.00
<b>Producers</b>	\$1,000,000.00	\$333,333.33	\$333,333.33	\$333,333.33
<b>TOTAL</b>	\$1,300,000.00	\$433,333.33	\$433,333.33	\$433,333.33
<b>WSF-LBBNRD Share</b>	\$300,000.00	\$100,000.00	\$100,000.00	\$100,000.00
<b># of Meters</b>	1000	334	333	333

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

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

The 1970 Kansas-Nebraska Big Blue River Compact mandates that at least 80 cubic feet per second flow into Kansas through the month of July. If water levels drop below that, the NDNR can order farmers with irrigation permits newer than November 1, 1968, to stop diverting water from the Big Blue River. This happened last in 2002 and 2003 and Gage County Extension at that time estimated that area farmers lost about \$750,000 to \$1 million as a result (Beatrice Daily Sun 2004<sup>3</sup>).

This project has the potential to increase stream flows in hydrologically connect areas by decreasing the overall pumping of groundwater through better management. By decreasing pumping for irrigation the potential exists for groundwater levels to rise and naturally contribute to surface water flow through springs and direct connection to localized alluvial aquifers.

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.

While there is no reduction of threats to property or critical infrastructure, there are benefits to public security, health, and safety. Improving irrigation water management in critical areas of the aquifer will help reduce conflicts between users and ensure that domestic water supplies are available for the long-term. Without a reliable supply of domestic water, especially for municipal wells, communities are at risk of having to implement expensive alternatives.

9. Improves water quality;

- Describe what quality issue(s) is/are to be improved.

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<sup>3</sup> Beatrice Daily Sun. July 18, 2016. *Irrigation shut down not expected*. Accessed July 18, 2016. [beatricedailysun.com](http://beatricedailysun.com).



- 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.

While water quality is a secondary benefit to this project, it is not one that will be ignored. Nitrate contamination of aquifers is another growing threat which the LBBNRD Board is facing today. Between 2009 and 2015, 109,524 acres were converted to row crop (NASS 2016<sup>4</sup>) across the entire LBBNRD. The majority of the ground converted was from a grass or pasture cover to soybeans or corn, resulting in a significant increase in fertilizer use and irrigation. The combination of irrigation and row crop is a known source of nitrate contamination. Reducing infiltration of nitrate past the effective root zone through irrigation water management is a recommended best management practice and will be achieved through this project.

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 project is supported by the primary sponsor, the LBBNRD. Improving irrigation management through installation of flow meters is also supported private well users and communities that have been facing sharp declines in water levels, resulting in a threatened water supply.

The LBBNRD's 2016 property tax levy is 0.025672. Approximately 77% of the cost for each water meter, using an average cost of \$1,300/meter, is the responsibility of the agricultural producer. The LBBNRD will cover up to \$300/unit or 23%. This project will enable the LBBNRD to provide cost-share on up to 1,000 units over the next three years. The LBBNRD will budget \$40,000 per year for the 2017-2019 fiscal years and has provided \$30,000 per year in the past to support their Flow Meter Cost-Share Program.

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.

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<sup>4</sup> United States Department of Agriculture. National Agricultural Statistics Services – CropScape – Cropland Data Layer. 2009 and 2015 land cover. Accessed July 18, 2016. [www.nassgeodata.gmu.edu/CropScape/](http://www.nassgeodata.gmu.edu/CropScape/)

- 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 LBBNRD is the local jurisdiction with a GMP in place, and an IMP currently being developed. On December 19, 1985, the District's first GMP went into effect pursuant to the passage of Nebraska Revised Statute Chapter 46, Article 6, Section 73.01 enacted by the 88th Nebraska Legislature. Since that time the plan has been amended twice to incorporate goals for groundwater quality. In 2013, the District began a process to update the plan by adopting new rules and regulations, including placing the entire District into a Phase 1 designation for water quantity. This project will implement a key management practice identified in the plan, as well as implement a key management action that will be identified in the IMP. The plan was developed through the authority granted by the Groundwater Management and Protection Act, as will the IMP.

The IMP is being developed and will include several goals that support water management. These goals will include at a minimum the following: creating a water inventory, managing water supply, managing water use, and better understanding of existing hydrogeology. The IMP development will include a wide variety of stakeholders

The target area is the entire LBBNRD. The LBBNRD does not currently require water meters on all wells, only new and replacement wells, and currently does not have any officially adopted Phase II Quantity Areas, but the possibility is there for these actions to occur in the near future.

The stakeholders include the LBBNRD, property owners, agriculture producers, industries, municipalities, private well users, NDNR, State of Nebraska, and many others. The project will immediately benefit the LBBNRD by providing essential data needed to improve water management. Agriculture producers will also benefit by improving their operations and reducing input cost through a more efficient application of water to crops.

#### 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.

It is the responsibility of the NRDs to manage groundwater in a sustainable manner and water sustainability is a vital issue statewide. This project will address the issue by improving irrigation water management, providing vital data to the LBBNRD, and decreasing irrigation water use. The LBBNRD will be able to make informed decisions on water management using water use reports from agricultural producers. This project will also address rising conflicts between water users, mainly irrigators and domestic water suppliers, and private well users. The project will benefit the 36,964 tax payers of the LBBNRD.

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 LBBNRD is leveraging its local tax payer funding with WSF sought in this application. While 77% of the cost of a meter is the responsibility of the producer, the combination of LBBNRD-WSF funding will allow for a more comprehensive project. The financial assistance provided through WSF will ensure a broader reach and impact across the LBBNRD for a much longer time than if only LBBNRD funds were utilized. The table below displays the breakdown of how the funding has been proposed. A letter of commitment for the LBBNRD match has been provided in Attachment B. It was not plausible to receive a letter of commitment from the producers, however, recent success with the Flow-Meter Cost-Share Program, and the new groundwater rules and regulations, leads the LBBNRD to strongly believe that producers will take advantage of this project.

<b>Funding Partner</b>	<b>Project Total</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
<b>WSF</b>	\$180,000.00	\$60,000.00	\$60,000.00	\$60,000.00
<b>LBBNRD</b>	\$120,000.00	\$40,000.00	\$40,000.00	\$40,000.00
<b>Producers</b>	\$1,000,000.00	\$333,333.33	\$333,333.33	\$333,333.33
<b>TOTAL</b>	\$1,300,000.00	\$433,333.33	\$433,333.33	\$433,333.33
<b>WSF-LBBNRD Share</b>	\$300,000.00	\$100,000.00	\$100,000.00	\$100,000.00
<b># of Meters</b>	1000	334	333	333

14. Contributes to watershed health and function;

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

This project will not directly affect watershed health and function. However, reducing groundwater pumping could positively affect watershed health and function by more effectively rising groundwater levels, which could ultimately increase stream flow. Flow meter cost-share will be provided district wide which encompasses 74 HUC 12 watersheds totaling 1,054,000 acres.

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.

This project falls in line with four of the five implementation objectives of the Nebraska State Water Planning and Review Process as listed by NDNR on page 1 of the Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process<sup>5</sup>.

- Objective 1 – The LBBNRD will maintain water meter data to be used for making programmatic decisions when implementing the GMP, and in the future, the IMP. They will better understand water uses and water supplies within the LBBNRD.
- Objective 2 – The LBBNRD will continue to provide staff and resources to support planning and implementation of water resources projects.
- Objective 3 – The LBBNRD will establish a voluntary IMP for maintaining hydrologically connected water supplies.
- Objective 5- The LBBNRD will coordinate with state agencies, agricultural producers, municipalities, and private well users on the successful implementation of this project.

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.

This project is not designed to meet requirements of a federal mandate.

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<sup>5</sup> Nebraska Department of Natural Resources. Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process. September 2015

## 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 Lower Big Blue Natural Resources District (LBBNRD), located in Beatrice, Nebraska, covers approximately 1,054,000-acres in southeast Nebraska within the Big Blue River Basin. The LBBNRD includes 23 communities and a population of nearly 37,000 and is shown in Figure 2. There are a total of 5,155 registered wells in LBBNRD which includes: 3,778 active wells, 2,392 irrigation, 610 domestic, 17 commercial, 34 observation, 539 monitoring, and 74 livestock. Several hundred domestic wells are used but are not registered.

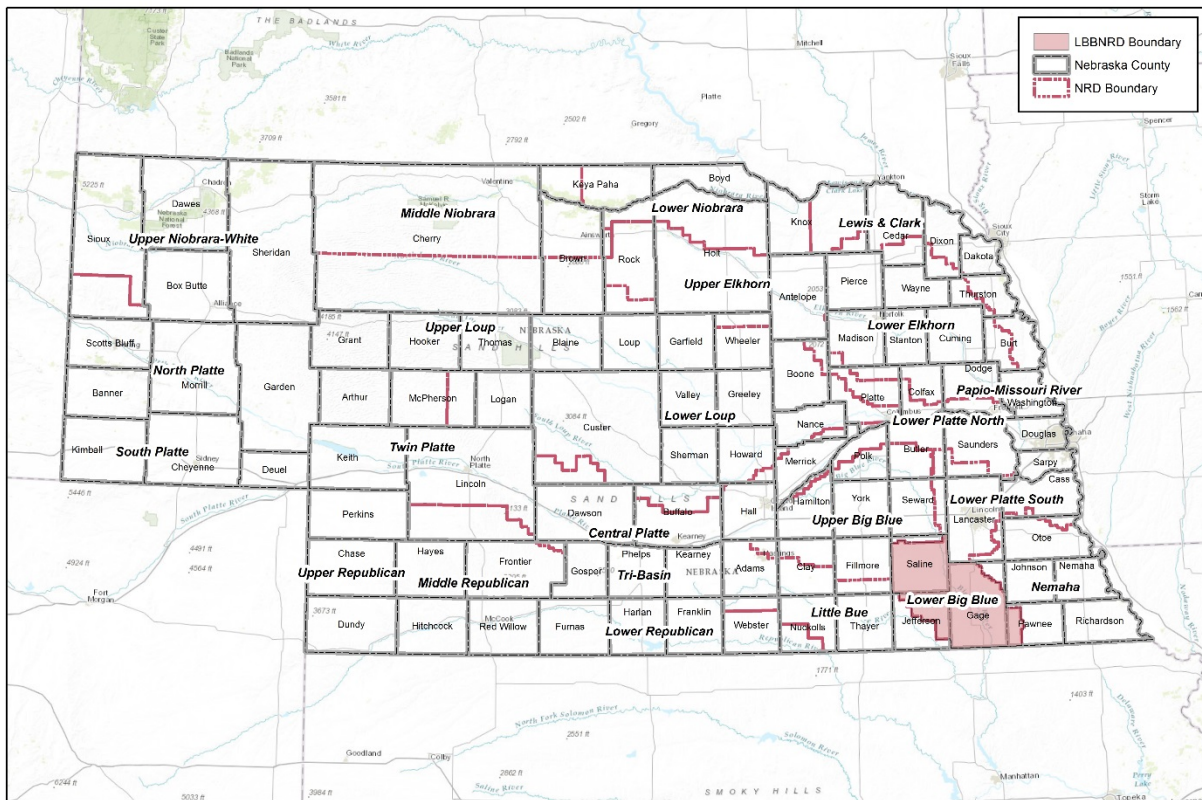
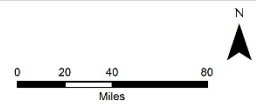


Figure 2 - Lower Big Blue NRD Location

LBBNRD - 2016 Water Sustainability Fund Application



Date: 7/22/2016 Source: ESRI, LBBNRD





Two major events have occurred in the last 10 years that have triggered the LBBNRD Board of Directors (Board) to take a proactive stance on management of water resources, including the 2012 drought and recent mass conversion of grass and pasture to irrigated row crop agriculture. The combination of drought and increase irrigation demand has created conflicts between producer's wells and domestic wells, including public water suppliers. The Board has decided to take action and seeks to manage surface and groundwater resources in a more sustainable manner.

While the LBBNRD monitors groundwater levels in the District to help determine sustainability, it had also received a growing number of reports about the reduced capacity or failure of several domestic and irrigation wells in the District. Due to concerns about the sustainability of groundwater supplies in the area, and under the authority of Nebraska Revised Statute 46-707 (2), the Board went into an immediate 180-day moratorium, or stay, on the construction of new wells designed to pump greater than 50 gallons per minute. The Board also discussed the increase of irrigated acres in the District at its monthly meeting on November 26, 2013.

The primary purpose for the stay was to provide the LBBNRD with an opportunity to revise and implement its Groundwater Management Plan (GMP). Specific management items under consideration by the LBBNRD included sustainability of groundwater supplies in marginal aquifers, setbacks from domestic wells, commingled wells or the number of wells permitted to run in series, a scoring system for evaluating and determining whether the proposed location of a well is appropriate, certification of irrigated acres and a water transfer policy.

Upon completion of the public hearing the updated rules and regulations were adopted and required the following: setback of irrigation wells from domestic wells, test hole requirements, scoring system for new well permits, certification of irrigated acres, groundwater transfers, limits to the number of wells in a series, and establishment of groundwater management areas. Upon establishment of the rules and regulations, the entire District was designated as a Phase I Groundwater Quantity Management Area. The Board has discussed designating Phase II areas, but at the time of this application no formal action has been planned. Therefore, the entire District is the target area for this project.

It's impossible to accurately gauge the impacts of current practices on the District's groundwater resources without knowing what those practices entail. The LBBNRD has measured the static water levels of a network of wells since 1982 and has installed 40 new dedicated monitoring wells between in 2015 and 2016. The LBBNRD Flow Meter Cost-Share Program has been in effect for almost 20 years, and during that time several irrigation wells in the District have been outfitted with various types of flow meters. Since 1999, nearly 500 flow meters have received cost-share. Additionally, since January 2011, all new and replacement irrigation wells have been required to have flow meters installed. Pursuant to Chapter 8 of the District's updated Groundwater Rules and Regulations, groundwater withdrawal reporting is required, and this data is

incredibly helpful in assessing the state of groundwater quantity throughout the District or within future sub-area of the District.

The LBBNRD is seeking to improve its capability to record water consumption of individual agricultural producers in order to make future management decisions using definitive and scientific data. As part of this project, the LBBNRD would like to install 1,000 additional flow meters by the end of 2019 by offering \$300 per unit cost-share to producers. The total project cost is anticipated to be \$1,300,000, of which \$180,000 is being requested from the Natural Resource Commission's Water Sustainability Fund. The LBBNRD has committed a total of \$120,000 over the three year period from 2017-2019.

There are several goals of this project that when implemented will help manage groundwater in a sustainable manner that will benefit everyone in the basin. The LBBNRD staff and its Board are committed to the project's success. The project's goals are listed below:

- The management of the quantity and quality of groundwater resources within the Big Blue River Basin will be enhanced through a comprehensive and collaborative flow metering cost-share program.
- The LBBNRD staff and Board of Directors will collaborate with agricultural producers, municipalities, and private well owners to better understand the effects of human activities on water quantity and quality and support actions to restore and protect resources from further degradation.
- The LBBNRD will provide \$300 cost-share per meter for the first 1,000 meters from 2017-2019.
- The LBBNRD can obtain scientific based data on the quantity of groundwater pumped in order to better manage groundwater resources so that water conflicts between domestic users and irrigators will be minimized in the future.

While flow meters are the focus of this application, the LBBNRD also offers producers cost-share for other irrigation management practices such as soil moisture sensors and ET gauges. A total of \$15,000 will be offered during the same project period those types of practices. The LBBNRD will continue to educate stakeholders on the importance of sustainability and continue to offer all of the Lower Big Blue River Basin's stakeholders an opportunity to manage water in a sustainable manner.

2. Project Tasks and Timeline

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

The project will begin in July 2017 and continue through 2019. The LBBNRD anticipates that the majority of the flow meters will be installed at the initiation of the project and continue at a steady pace throughout.

PROJECT TASKS	2016		2017				2018	2019
	3 <sup>rd</sup> Q	4 <sup>th</sup> Q	1 <sup>st</sup> Q	2 <sup>nd</sup> Q	3 <sup>rd</sup> Q	4 <sup>th</sup> Q		
Funding Application	July							
Notification of Award		Dec						
Initiate Project					July			
Continue Project								

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.

- Lower Big Blue NRD – provides cost-share, flow meter inspections, technical assistance to producers, information and education, and will administer the grant.
- Agricultural Producers – will install flow meters, operate and maintain flow meters, report issues to the LBBNRD, provide water use reports upon request, or as required, depending upon changes to future rules and regulations.
- Natural Resources Commission – providing funding assistance through the Water Sustainability Fund
- Natural Resources Conservation Service – will provide technical assistance.
- University of Nebraska Extension – will help install soil moisture sensors, ET gauges, and provide information and education within groundwater management areas.

4. Other Sources of Funding

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when

confirmation is expected. Explain how you will implement the project if these sources are not obtained.

The overall project cost is \$1,300,000 using a conservative estimate of \$1,300/meter. The LBBNRD will budget \$40,000 per year for the Flow Meter Cost-Share Program in 2017-2019 for a total cash contribution of \$120,000, or 40% of the net local share. A total of \$180,000 is requested from the WSF, or 60% of the remaining net local share. Producers would be responsible for contributing the remaining \$1,000,000. If funding is not received as requested, the LBBNRD will fall short of its goal to provide cost-share for 1,000 flow meters. The Flow Meter Cost-Share Program is ongoing and will be enhanced greatly by this project.

<b>Funding Partner</b>	<b>Project Total</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
<b>WSF</b>	\$180,000.00	\$60,000.00	\$60,000.00	\$60,000.00
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<b># of Meters</b>	1000	334	333	333

5. Support/Opposition

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

Support for this project begins with the LBBNRD staff, Board of Directors, and the private well owners and municipalities that have experienced well interference issues. Both support and opposition comes from agricultural producers. Nearly 500 producers have voluntarily added flow meters to their operation, while others have been required to for new wells or replacement wells since 2011.

**ATTACHMENT A**

**IMP Initiation Letter**



**Lower Big Blue**  
**Natural Resources District**

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*Established in 1972 for the Development and Conservation of Soil and Water Resources*

July 29, 2016

Jennifer Schellpeper  
Nebraska Department of Natural Resources  
301 Centennial Mall South 4<sup>th</sup> Floor  
Lincoln, NE 68509-4676

Dear Jennifer,

This letter is to advise the Nebraska Department of Natural Resources that the Lower Big Blue Natural Resources District would like to go on record as requesting to work with the DNR to develop a voluntary Integrated Management Plan.

The Lower Big Blue NRD Board of Directors took action to approve this request in their monthly board meeting on July 28, 2016. Please contact us in the next few months to begin the voluntary Integrated Management Plan process.

Sincerely,

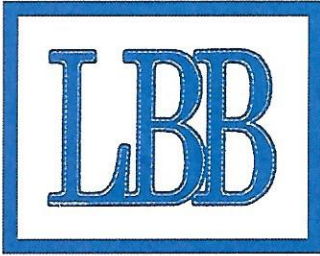


Dave Clabaugh  
Manager



## ATTACHMENT B

### Financial Commitment Letter



**Lower Big Blue**  
**Natural Resources District**

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*Established in 1972 for the Development and Conservation of Soil and Water Resources*

July 28, 2016

Director Jeff Fassett, P.E.  
Nebraska Department of Natural Resources  
P.O. Box 94676  
Lincoln, NE 68509-4676

Subject: Letter of Water Sustainability Fund Grant Application Financial Commitment  
- Groundwater Management for Sustainability Project

Dear Director Fassett,

The Lower Big Blue Natural Resources District (District) is committed to providing the 40% local match, in the amount of \$120,000.00, which is required to receive the 60% funding in the amount of \$180,000.00 from the Water Sustainability Fund to install 1000 additional flow meters by the end of 2019. The District will provide a total of \$120,000 over the three year project application period from 2017 to 2019. In addition, the District's producers will contribute an additional 1 million dollars over the three year project.

The District Board of Directors approved a motion at their July 28, 2016 meeting to submit the Water Sustainability Fund Application and to commit to the local match.

If you have any questions or need additional information, please contact me.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Dave Clabaugh', written over the word 'Sincerely'.

Dave Clabaugh, Lower Big Blue NRD Manager

Cc: J. Scott Sobotka, Lower Big Blue NRD Assistant Manager