NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: UENRD Reverse Osmosis project.

SPONSOR'S *PRIMARY CONTACT INFORMATION* **(Not Consultant's)**

Sponsor Business Name: Upper Elkhorn NRD (UENRD)

Sponsor Contact's Name: Dennis Schueth

Sponsor Contact's Address: 301 N Harrison Street, O'Neill NE 68763

Sponsor Contact's Phone: 402-336-3867

Sponsor Contact's Email: dschueth@uenrd.org

1. **Funding** amount requested from the Water Sustainability Fund:

   Grant amount requested. $ 249,000.00

   - If requesting less than 60% cost share, what %? Click here to enter text.

   If a loan is requested amount requested. $ Click here to enter text.

   - How many years repayment period? Click here to enter text.
   - Supply a complete year-by-year repayment schedule. Click here to enter text.

2. **Neb. Rev. Stat. § 2-1507 (2)**

   Are you applying for a **combined sewer overflow 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☐
- Attach a copy to your application. Click here to enter text.
- What is the population served by your project? Click here to enter text.
- Provide a demonstration of need. Click here to enter text.
- **Do not complete the remainder of the application.**

3. **Permits Required/Obtained** Attach a copy of each that has been obtained. For those needed, but not yet obtained (box **"NO"** checked), 1.) State when you will apply for the permit, 2.) When you anticipate receiving the permit, and 3.) Your estimated cost to obtain the permit.

(N/A = Not applicable/not asking for cost share to obtain)
(Yes = See attached)
(No = Might need, don't have & are asking for 60% cost share to obtain)

G&P - T&E consultation (required)	N/A☒ Obtained: YES☐ NO☐
DNR Surface Water Right	N/A☒ Obtained: YES☐ NO☐
USACE (e.g., 404/other Permit)	N/A☒ Obtained: YES☐ NO☐
FEMA (CLOMR)	N/A☒ Obtained: YES☐ NO☐
Local Zoning/Construction	N/A☒ Obtained: YES☐ NO☐
Cultural Resources Evaluation	N/A☒ Obtained: YES☐ NO☐
Other (provide explanation below)	N/A☒ Obtained: YES☐ NO☐

Click here to enter text.

4. **Partnerships**

List each Partner / Co-sponsor, attach documentation of agreement:
The UENRD is the sole entity aside from WSF involved in the implementation of this project.

Identify the roles and responsibilities of each Partner / Co-sponsor involved in the proposed project regardless of whether each is an additional funding source.

The UENRD will provide 40% of up to $2250 per household of the cost share for the initial nitrate sample test, the purchase and installation of point use reverse osmosis systems, the follow up nitrate test, and the first set of replacement filters for qualifying households within the district. The WSF will provide 60%, of up to $2250 per household. The UENRD will also promote the cost-share program availability to the district residents via multiple media means.

5. **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 entire project will be $415,000, with the WSF contributing $249,000 and the UENRD contributing $166,000. The UENRD funds are confirmed. This project will not be implemented without both sources.

6. **Overview**

In 1,000 words *or less*, provide a brief description of your project including the nature/purpose of the project and its objectives. Do not exceed one page!

The purpose of our project and our request for funding is to provide safe, clean drinking water to every rural resident in this district that qualifies and wants to participate within the budgetary guidelines. This project is intended to complement the work that has been going on for the past 50 years in the UENRD. Groundwater nitrate levels that exceed the Safe Drinking Water Standard of 10ppm have been documented across the UENRD for many years. The major cause of this rise was the intense continuous row crop farming that occurred in this area in the 1970's and 1980's. This coincided with the development of center-pivot irrigation. The scale of the causes and effects of nitrate contamination were not originally understood or monitored until the NRD's brought them forward and began trying to solve this issue. UENRD has utilized many different educational programs and various regulations throughout the years. However, it is becoming painfully obvious that we are only identifying the problems and possible long-term solutions without actually having made significant progress in immediate reduction of nitrate levels at the faucet. Because of the knowledge of the hydrogeology of the district, we can understand why this is true. These problems took about 40 years to create, and it appears that no matter what we do, it will probably be a similar amount of time before the ground and water can clear itself of those earlier mistakes. There are ways to greatly reduce the risk of contamination. These are the programs that UENRD has been pursuing for many years, but they can do nothing to change the nitrogen that is already in the water

and the ground below the crop zone. So even with best practices, or even completely eliminating the use of nitrogen, some areas would not see an improvement in their nitrate levels in the water for years, up to even generations in some cases. So how do we protect people in the interim? We believe there is a solution. It is a one-time defined initial cost and will result in an immediate reduction in the drinking water nitrate level, and thus the related health issues. Technology has advanced in the reverse osmosis industry and prices have become somewhat more reasonable than in the past. We believe that reverse osmosis can be the bridge to get us from the mistakes of the past, while allowing the largest industry in the state to continue to flourish until today's farming practices can minimize the health issues caused by high nitrates. We believe our goal of providing drinking water within the safe drinking water standards for nitrate is the best possible solution to a problem that cannot wait a generation to show results. It is proven, and it is immediate, and very doable on any scale that matches whatever budgeting is available

7. **Project Tasks and Timeline**

Identify what activities will be conducted to complete the project, and the anticipated completion date.
For multiyear projects please list (using the following example):

Tasks	Year 1$	Year 2$	Year 3$	Remaining	Total $ Amt.
Permits	$18,000				$18,000
Engineering		$96,000			$96,000
Construction		$87,000	$96,000		$183,000
Close-out				$8,000	$8,000
				TOTAL	$305,000

Task	**Year 1$**	**Year 2$**	**Year 3$**	**Years 4$**	**Year 5$**
RO Install	**$415,000**	**Carryover**	**Carryover**	**Carryover**	**Carryover**
				TOTAL	**$415,000**

- What activities (Tasks) are to be completed.
- An estimate of each Tasks expenditures/cost per year.
- Activities in years 4 through project completion under a single column.

It is anticipated that this project could be completed in less than one calendar year from the date the funding becomes available, but in the event that turns out not to be the case, it has been illustrated out for 5 years carrying over the unspent funds forward. If the grant is fully funded to the requested amount, and the UENRD contribution is added to it, there would be funding for approximately 184 units at the latest bid pricing. Residents would be notified through advertising that they could have any domestic drinking well for human consumption tested for potential reverse osmosis

cost share. Within a defined window of time-the first two months of the project, the wells with the highest nitrate levels above the Safe Drinking Water Standard would be prioritized for a reverse osmosis system. Past that window or with insufficient applications, the remainder would be funded accordingly. The funding of up to $2250 per household would reimburse the costs for the initial nitrate sample test, the purchase and installation of point use reverse osmosis systems, the follow up nitrate test, and the first set of replacement filters for qualifying households within the district.

8. **IMP**

Do you have an **Integrated Management Plan** in place, or have you initiated one? YES☒ NO☐ Sponsor is not an NRD☐

Section B.

DNR DIRECTOR'S FINDINGS

Prove Engineering & Technical Feasibility
(Applicant must demonstrate compliance with Title 261, CH 2 - 004)

1. Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?
YES☐ NO☒

If you answered "YES" you must answer all questions in section 1.A.
If you answer "NO" you must answer all questions in section 1.B.

If "YES", it is considered mostly structural, so answer the following:

1.A.1 Insert a feasibility report to comply with Title 261, Chapter 2, including engineering and technical data; Click here to enter text.

1.A.2 Describe the plan of development (004.01 A); Click here to enter text.

1.A.3 Include a description of all field investigations made to substantiate the feasibility report (004.01 B); Click here to enter text.

1.A.4 Provide maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C); Click here to enter text.

1.A.5 Describe any necessary water and/or land rights including pertinent water supply and water quality information (004.01 D); Click here to enter text.

1.A.6 Discuss each component of the final plan (004.01 E); Click here to enter text.

1.A.7 When applicable include the geologic investigation required for the project (004.01 E 1); Click here to enter text.

1.A.8 When applicable include the hydrologic data investigation required for the project (004.01 E 2); Click here to enter text.

1.A.9 When applicable include the criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3). Click here to enter text.

If "NO", it is considered mostly non-structural, so answer the following:

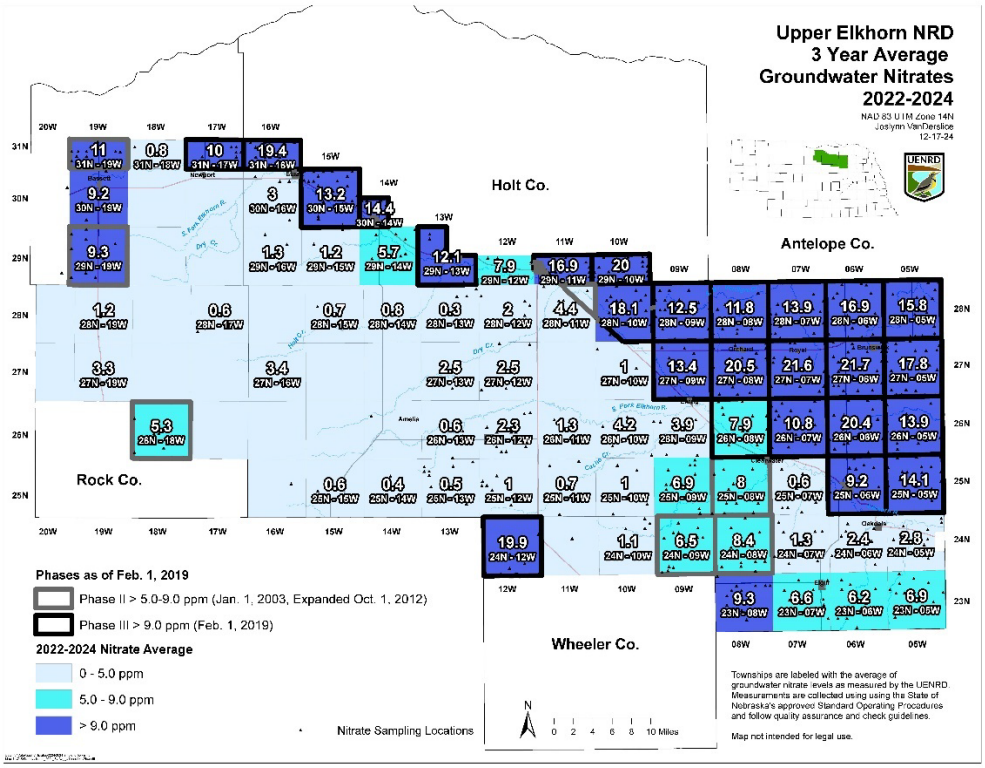
1.B.1 Insert data necessary to establish technical feasibility (004.02); **The UENRD would ensure that the well being considered for reverse osmosis is both located within the district and exceeds the nitrate Safe Drinking Water**

Standard by having the water sample tested at an accredited laboratory. The actual installation would be undertaken by a licensed plumber or other professional of choice of the well owner and the first filter change would be undertaken by a licensed plumber, other professional of choice, or the well owner. The UENRD would also facilitate a post reverse osmosis water sample at an accredited laboratory to verify the effectiveness of the reverse osmosis system in bringing the water to within nitrate Safe Drinking Water Standards.

1.B.2 Discuss the plan of development (004.02 A); **District residents would be notified through multiple media means that cost share of up to $2,250 per point use reverse osmosis system per household is available for domestic wells exceeding the nitrate Safe Drinking Water Standard. This initial advertisement would start a 60 day window wherein the wells with the highest nitrates would be prioritized for a reverse osmosis system. Upon contact by the resident, the UENRD would ensure the well in question is located within the district and facilitate water sample testing at an accredited laboratory. After the 60 day window, the wells with the highest nitrate levels exceeding the Safe Drinking Water Standard would be approved for a reverse osmosis system, subject to available funding. The resident would pay for the installation and present the receipt for cost share reimbursement of up to $2,250. Depending upon fund availability, the remaining funds would be approved for any well exceeding the nitrate Safe Drinking Water Standard outside of the 60 day window until the end of the grant life. After installation, a second water sample would be sent to an accredited laboratory to ensure the effectiveness of the reverse osmosis system. The pre sample, the reverse osmosis unit and installation, the post sample, and the first filter change would all be eligible for cost share up to the $2,250 amount. If the pre sample didn't exceed the nitrate Safe Drinking Water Act standard, that cost would not be reimbursed. The long-term maintenance of filters and membranes would fall to the resident.**

1.B.3 Describe field or research investigations utilized to substantiate the project conception (004.02 B); **University studies, showing health issues related to high nitrates in drinking water, coupled with the lack of immediate results of NRD programs, show the need for something to bridge the gap of improved farming practices to eventual lowering of nitrate levels in the groundwater. Something is needed to fill that gap, and reverse osmosis is the proven way to do that. The UENRD collects extensive irrigation water samples, which mirror the domestic well issues, that demonstrate that a significant portion of our district falls above the nitrate Safe Drinking Water**

Standard.



1.B.4 Describe any necessary water and/or land rights (004.02 C); **NA**

1.B.5 Discuss 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). **There are no needed structural measures needed related to this project except for the installation of reverse osmosis units in individual homes.**

Prove Economic Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 - 005)

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 have been numerous attempts, at a cost of many millions of dollars, to lower nitrate readings through changes in farming practices. These are well-intentioned and continue today and show promise of attaining their goals in the future. None have been successful in reducing the nitrate concentrations immediately. Although they may ultimately show success, it almost certainly will be decades, and possibly generations before complete reduction of levels of nitrates will be achieved in the area's water. The only**

way to provide water within the nitrate Safe Drinking Water Standard in short order is to buy bottled water or treat water onsite with a reverse osmosis system. Bottled water, assuming 2.3 gallon/household/day would run approximately $2.88 / day in acquisition costs at a minimum, ignoring delivery costs/logistics. (UENRD has a household size of approximately 2.3 persons, bottled water is conservatively $1.25/gal and consumption is approximately 1 gal/person/day.) Reverse osmosis, in contrast, assuming a 20 year lifespan for the system, costs approximately $0.88 / day between the initial cost, the membrane replacements, and filter replacements. The bottled water route would be more than 3x more expensive. Reverse osmosis is a proven method that will solve the immediate health concerns. This will protect people TODAY, and will allow the various programs in place, to lower levels over the next several generations.

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 is the project life. (Title 261, CH 2 - 005). **The cost of this program is $2250 per contaminated well. This dollar amount should be adequate to cover the cost of pre and post testing, installation of the reverse osmosis system, and facilitate the scheduled filter maintenance after one year of operation. The approximately $220 annual maintenance costs thenceforth will be the responsibility of the resident. The benefit is water that meets the nitrate Safe Drinking Water Standard immediately, as well as possible additional health benefits from any other contaminants that may be in the drinking water for that household. It is estimated that these units will last more than 20 years with proper maintenance.**

3.A 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). **There will be no additional cost share available after the initial installation and the first-year replacement filters. At that point the resident would have received instructions for membrane and filter replacement at the resident's cost.**

3.B 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 intangible or secondary benefits (if any) 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, in a way that justifies economic feasibility of the project such that the finding can be approved by the

Director and the Commission (005.02). **This project will increase water sustainability by remediating nitrate contamination of domestic groundwater (2-1506.1.b), promoting the objectives of the UENRD Voluntary Integrated Management Plan (2-1506.1.c), enhancing water quality (2-1506.1.f), bringing domestic groundwater into nitrate Safe Drinking Water Act guidelines (2-1506.h), all while being the most cost effective method to yield immediate results (2-1506.1.g).**

3.C Present all cost and benefit data in a table to indicate the annual cash flow for the life of the project (005.03).

Any unused portion of the budget will carry over to the next year until year 5.

Entity	Year 1	Year 2	Year 3	Year 4	Year 5
WSF	$249,000	Carryover	Carryover	Carryover	Carryover
UENRD	$166,000	Carryover	Carryover	Carryover	Carryover

3.D 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, demonstrate the economic feasibility of such proposal by such method as the Director and the Commission deem appropriate (005.04). (For example, show costs of and describe the next best alternative**.) The only way to provide water within the Safe Drinking Water Standard in short order is to buy bottled water or treat water onsite with a reverse osmosis system. Bottled water, assuming 2.3 gallon/household/day would run approximately $2.88 / day in acquisition costs at a minimum, ignoring delivery costs/logistics. (UENRD has a household size of approximately 2.3 persons, bottled water is conservatively $1.25/gal and consumption is approximately 1 gal/person/day.) Reverse osmosis, in contrast, assuming a 20 year lifespan for the system, costs approximately $0.88 / day between the initial cost, the membrane replacements, and filter replacements. The bottled water route would be more than 3x more expensive.**

Prove Financial Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 - 006)

4. Provide evidence that sufficient funds are available to complete the proposal. **The 2025-2026 UENRD budget will have $166,000 allotted for this project.**

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace**). These costs would be one-time upfront. Annual revenue would not be applicable**

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal. **NA**

7. Describe how the plan of development minimizes impacts on the natural environment (i.e. timing vs nesting/migration, etc.). **This plan has zero negative impact on the natural environment. Its impact is wholly to improve the health of the people drinking the water in the area and thereby enhance their overall wellbeing and ability to continue to provide economic activity to support the area.**

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds. **This project only requires the installation of reverse osmosis units in the district. The installation would be done by a licensed plumber or other professional familiar with reverse osmosis installations. Oversight would be through the UENRD, which has extensive experience in these types of projects.**

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state. **As an NRD, our 12 responsibilities include both "water supply for beneficial uses" and "development, management, utilization, and conservation of groundwater and surface water. While we are also addressing the nitrate contamination at the long-term field level, this addresses it on a much shorter timescale. Further, our Voluntary Integrated Management plan's purpose is "to attain and maintain a desired balance between uses and supplies of both surface water and groundwater sources so economic viability, as well as social and environmental health, safety, and welfare, can be achieved and maintained in the District for both the near-term and long-term, while considering effects on existing surface water appropriators and groundwater users. This project accomplishes the economic viability, by allowing the more modern farming methods to continue to reduce the nitrate loads, while at the same time protecting the existing domestic groundwater users consistent with the Safe Drinking Water Act. Also, the UENRD's Groundwater Management Plan's Groundwater Reservoir Life Goal is to "protect the quality and quantity of groundwater, and to support reasonable and beneficial uses…" which is right in line with this project.**

10. Are land rights necessary to complete your project? YES☐ NO☒

If yes:

10.A Provide a complete listing of all lands involved in the project. Click here to enter text.

10.B Attach proof of ownership for each easements, rights-of-way and fee title currently held. Click here to enter text.

10.C 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. **As an NRD, our authority is granted by the legislature of the state of Nebraska via the Nebraska Groundwater Management Act to protect the water quantity and most relevant to this project, the quality of our water for the use of the district's residents.**

12. Identify the probable consequences (environmental and ecological) that may result if the project is or is not completed. **If the project is not completed, it is possible and indeed probable that the state or federal government will require the application of nitrogen on crop land to be severely limited or even eliminated until the safety of the residents can be assured. While eliminating the application of nitrogen may be environmentally and ecologically beneficial, the economics of it would literally destroy the state of Nebraska's economy. Initially it might be the rural area's demise, but the towns and cities would not be far behind without the economic activity of the crops and cattle produced in the state. This program will apply a lifeline to the farming industry until the newer conservation methods can eventually work their way through the landscape. If the project is completed, it will allow for compliance with the nitrate Safe Drinking Water Act Standard for those funded wells while at the same time allowing for the improved farming practices to continue to reduce the environmental impact that has occurred.**

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 to 6 for items (1) - (9); and 0 to 3 for items (10) - (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 72 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted above. 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. **This will eliminate immediately, the threat of illness associated with high nitrate levels. The project will bring domestic well water to within the nitrate Safe Drinking Water Standard, eliminate the possibility of methemoglobinemia in infants, and decrease the likelihood of miscarriages, birth defects, and cancer incidences.**

    - Identify whose drinking water, how many people are affected, how will project remediate or mitigate. **The project targets rural domestic wells within the**

UENRD that test above the 10ppm nitrate Safe Drinking Water Standard. At a cost of $2250 per unit/household of approximately 2.3 persons, approximately 424 people would be provided water within the Safe Drinking Water Standard. The nitrate in the drinking water would be remediated via the reverse osmosis membrane.

- Provide a history of issues and tried solutions. **The UENRD has been collecting irrigation water samples since the 1970's to track nitrate levels. In response to the ever-increasing levels, we have designated the entire district a Phase I groundwater management area, and those areas that continuously maintain high levels of nitrates have been designated Phase II or III. These designations are accompanied by increasingly intense educational outreach to educate producers with the intent to reduce overapplication of nitrogen that invariably ends up in the groundwater, both through phase II forms and in person meetings and classes. We have partnered with the University of Nebraska-Lincoln and a multitude of other entities in our portion of the Bazile Groundwater Management Area with the objective of educating the producers and thus reducing the overapplication of nitrates, encouraging cover crop utilization, and other modernization/efficiency improvements. It is showing some signs of improvement on the issue of less nitrogen being introduced to the groundwater. The issue with nitrate levels is that the nitrogen in the ground between where the crop can reach it and the water table (vadose zone) holds nitrates that have to move down though that level to the water table. NRD's deep testing has indicated in the Creighton NE area there was a sample that contains approximately 600 lbs of N in the vadose zone. It is unlikely that anyone alive today will live to see that work its way completely through to the water level, even if zero nitrates escape with the present programs. The UENRD has a cost share system in place for reverse osmosis systems, but residents bear a much greater share of the cost. The state tried a similar program with greater cost share than we provide with our current program, but were only able to get 36 reverse osmosis systems installed in the UENRD. We suspect that the portion requiring well registration as well as the impersonal scale that it was invariably conducted may have been a deterrent. It is the intent that by installing reverse osmosis equipment, we can provide water now that conforms to the Safe Drinking Water Act, while at the same time continue to allow the more efficient modern farming practices to have sufficient time to be reflected**
- Provide detail regarding long-range impacts if issues are not resolved.

It is possible and indeed probable that the state or federal government will require the application of nitrogen on crop land to be severely limited or even eliminated until the safety of the residents can be assured. While eliminating the application of nitrogen may be environmentally and ecologically beneficial, the economics of it would literally destroy the state of Nebraska's economy. Initially it

might be the rural area's demise, but the towns and cities would not be far behind without the economic activity of the crops and cattle produced in the state. This program will apply a lifeline to the farming industry until the newer conservation methods can eventually work their way through the landscape. Further, having domestic well water with nitrate levels above the nitrate Safe Drinking Water Standard carries the associated cancer and methemoglobinemia risks.

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 Upper Elkhorn NRD's February 1, 2019 Voluntary Integrated Management Plan's purpose is "to attain and maintain a desired balance between uses and supplies of both surface water and groundwater sources so economic viability, as well as social and environmental health, safety, and welfare, can be achieved and maintained in the District for both the near-term and long-term, while considering effects on existing surface water appropriators and groundwater users." This project accomplishes economic viability, by allowing the more modern farming methods to continue to reduce the nitrate loads, while at the same time protecting the existing domestic groundwater users consistent with the Safe Drinking Water Act. Further, the October 1, 2021 UENRD's Groundwater Management Plan's Groundwater Reservoir Life Goal is to "protect the quality and quantity of groundwater, and to support reasonable and beneficial uses for the District's groundwater for an infinite period of time," which is right in line with this project of improving quality and supporting beneficial uses. We as an NRD have promoted water quality preservation since shortly after our inception. We have collected irrigation water samples since the 1970's to track the trends in nitrate in groundwater. We have promoted educational opportunities and on-farm demonstrations over the years to improve efficiency and decrease groundwater contamination. We are partners in the Bazile Management Area where we share a staff member with three other NRD's tasked with promoting BMP's, new technology integration, and just about any other idea that could lead to a reduction in nitrate lost to the groundwater. While there has been increases in nitrogen efficiency and reductions in the amount getting to the groundwater, the concern is that the time scale to realize results for the end user, the domestic well drinker, is not short enough. This project will allow for an immediate realization in the reduction of nitrate such that the nitrate Safe Drinking Water Standard is met, while at the same time continue to

allow for the improved farming practices to be implemented and realized over the long term.

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.

   Not applicable to this funding request.

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

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

   This project is entirely dedicated to improving the safety of the drinking water within this district. The goal is to have as many domestic wells as possible within the district that test above the nitrate Safe Drinking Water Standard equipped with a reverse osmosis system within the budget guidelines, up to 184 or so. This will provide immediate as well as lasting effects on providing drinking water within nitrate Safe Drinking Water Standards. This is beneficial both directly to the people consuming the water and to the economy in the area, as well as across the entire state if it were to be implemented on that scale. We have already spent a sum of money to do this with other long term field level programs and have not seen immediate improvement. University and federal research has shown correlation between high nitrate levels in drinking water and cancer as well as methemoglobinemia in babies. Bringing more drinking water to within the nitrate Safe Drinking Water Standard will decrease the likelihood of cancer cases in the district.

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 allows the state's farming economy to continue moving forward, using the best management practices. No beneficial uses should be reduced because of anything associated with this program. It would increase the beneficial use in that water that was previously unsafe to drink due to nitrate contamination would be brought to within the nitrate Safe Drinking Water Standards.

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.

While we as an NRD have been and will continue to promote multiple long-term solutions to reduce nitrate in groundwater at the field level, the only way to provide water within the nitrate Safe Drinking Water Standard to rural domestic well users in short order is to buy bottled water or treat water onsite with a reverse osmosis system. Bottled water, assuming 2.3 gallon/household/day would run approximately $2.88 / day in acquisition costs at a minimum, ignoring delivery costs/logistics. (UENRD has a household size of approximately 2.3 persons, bottled water is conservatively $1.25/gal and consumption is approximately 1 gal/person/day.) Reverse osmosis, in contrast, assuming a 20 year lifespan for the system, costs approximately $0.88 / day between the initial cost, the membrane replacements, and filter replacements. The bottled water route would be more than 3x more expensive. The only cost to the project is approximately $2250 per well to pre-test the water to determine if the well is eligible, install the reverse osmosis system, post-test the well to ensure the filter is working, and replace filters at the one-year mark and benefits are immediate. If this project is fully funded, (WSF $249,000, UENRD $166,000) we should be able to equip approximately 184 households with a reverse osmosis system. The value of clean water is priceless to the person who doesn't become ill from drinking unsafe water.

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 Safe Drinking Water Act dictates the MCL for nitrate as 10ppm. Based upon the UENRD's extensive irrigation water sampling, the UENRD's limited domestic water sampling, and the state of Nebraska's recent domestic well sampling, it is apparent that there are many rural households within the Upper Elkhorn NRD that do not have access to water within the nitrate Safe Drinking Water Standard. Installing reverse osmosis systems on those wells that test above the nitrate Safe Drinking Water Standard will work towards the Upper Elkhorn NRD satisfying their state directive of protecting the water quality of the existing users and complying with the Safe Drinking Water Act.

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.

Nitrogen is a two-edged sword in that it has resulted in groundwater that does not meet the nitrate Safe Drinking Water Standards while at the same time it is a direct driver of the economy of the area. Without agriculture, there would be no need for the rural domestic wells. There is concern that the solution to the nitrate problem may be nonlocally dictated as a prohibition on nitrogen application altogether. It is hoped that this approach will allow for the agriculture of the area to continue to drive the economy with improved farming methods that will one day be reflected in the groundwater nitrate levels, while providing water that meets the nitrate Safe Drinking Water Standards now. Agriculture is the largest component of the state's economy, it provides the food and fiber necessary to maintain a secure and healthy state.

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 project targets rural domestic wells within the UENRD that test above the 10ppm nitrate Safe Drinking Water Standard. At a cost of approximately $2250 per unit/household of approximately 2.3 persons, approximately 424 people would be provided drinking water within the nitrate Safe Drinking Water Standard. The nitrate in the drinking water would be remediated via the reverse osmosis membrane.
While we as an NRD have been and will continue to promote multiple long-term solutions to reduce nitrate in groundwater at the field level, the only way to provide water within the nitrate Safe Drinking Water Standard to rural domestic well users in short order is to buy bottled water or treat water onsite with a reverse osmosis system. Bottled water, assuming 2.3 gallon/household/day would run approximately $2.88 / day in acquisition costs at a minimum, ignoring delivery costs/logistics. (UENRD has a household size of approximately 2.3 persons, bottled water is conservatively $1.25/gal and consumption is approximately 1 gal/person/day.) Reverse osmosis, in contrast, assuming a 20 year lifespan for the system, costs approximately $0.88 / day between the initial cost, the membrane replacements, and filter replacements. The bottled water route would be more than 3x more expensive. The value of clean water is priceless to the person who doesn't become ill from drinking unsafe water.
The UENRD has been collecting irrigation water samples since the 1970's to track nitrate levels. In response to the ever-increasing levels, we have designated the entire district a Phase I groundwater management area, and those areas that continuously maintain high levels of nitrates have been designated Phase II or III. These designations are accompanied by increasingly intense educational outreach to educate producers with the intent to reduce overapplication of nitrogen that invariably ends up in the groundwater, both through phase II forms and in person meetings and classes. We have partnered with the University of Nebraska-Lincoln and a multitude of other entities in our portion of the Bazile Groundwater Management Area with the objective of educating the producers and thus reducing the overapplication of nitrates, encouraging cover crop utilization, and other modernization/efficiency improvements. It is showing some signs of improvement on the issue of less nitrogen being introduced to the groundwater. The issue with nitrate levels is that the nitrogen in the ground between where the crop can reach it and the water table (vadose zone) holds nitrates that have to move down though that level to the water table. NRD's deep testing has indicated in the Creighton NE area there was a sample that contains approximately 600 lbs of N in the vadose zone. It is

unlikely that anyone alive today will live to see that work its way completely through to the water level, even if zero nitrates escape with the present programs. The UENRD has a cost share system in place for reverse osmosis systems, but residents bear a much greater share of the cost than this project entails. The state tried a similar program with greater cost share than we provide with our current program, but were only able to get 36 reverse osmosis systems installed in the UENRD. We suspect that the portion requiring well registration as well as the impersonal scale that it was invariably conducted may have been a deterrent. It is the intent that by installing reverse osmosis equipment, we can provide water now that conforms to the nitrate Safe Drinking Water Act, while at the same time continue to allow the more efficient modern farming practices to have sufficient time to be reflected

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 Upper Elkhorn Natural Resources District is sponsoring this project. For our FY2024-2025 Budget, our levy was 0.028963 with a total valuation of $5,563,946,800.00. The UENRD also sources funds via the Natural Resources Water Quality Fund, to the tune of approximately $46,000 in FY24-25. There are no other funding sources for the project.

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 Upper Elkhorn NRD's Groundwater Management Plan and Voluntary Integrated Management Plan support sustainable water use. The UENRD's February 1, 2019 Voluntary Integrated Management Plan's purpose is "to attain and maintain a desired balance between uses and supplies of both surface water and groundwater sources so economic viability, as well as

social and environmental health, safety, and welfare, can be achieved and maintained in the District for both the near-term and long-term, while considering effects on existing surface water appropriators and groundwater users." Further, the October 1, 2021 UENRD's Groundwater Management Plan's Groundwater Reservoir Life Goal is to "protect the quality and quantity of groundwater, and to support reasonable and beneficial uses for the District's groundwater for an infinite period of time,". Central to both plans is protecting quality and quantity of groundwater now and into the future. Regarding quality, as an NRD we collect nitrate data on every active registered irrigation well in the district. Our staff collect samples on approximately 685 irrigation wells, and the rest are producer submitted on a rotating basis in conjunction with their district required nitrogen education. We collect crop report data on all fields in townships with elevated nitrate levels to track nitrogen application rates. On the quantity side, we collect static water level readings on 365 wells every fall and spring to track changes in the water levels. We also track flowmeter readings on approximately 430 irrigation wells. Both sets of data are then used to feed back into our modeling to ensure that we remain sustainable in our usage. We also have a drought plan in place to restrict groundwater withdrawal to ensure all users are protected in the event our groundwater levels drop below our preset thresholds. The most visible outcome of this project is providing water within the nitrate Safe Drinking Water Standard, a definite improvement in the quality aspect. This project protects existing users by allowing irrigated farming to continue with improved farming methods that will one day be reflected in lower groundwater nitrate levels while at the same time delivering water within the nitrate Safe Drinking Water Standard to existing domestic users. This project will also give us more data as to where nitrate contamination may or may not be an issue within our district, which will help us guide our administrative approach within the district. The project targets rural domestic wells within the UENRD that test above the 10ppm nitrate Safe Drinking Water Standard. At a cost of approximately $2250 per unit/household of approximately 2.3 persons, approximately 424 people would be provided drinking water within the nitrate Safe Drinking Water Standard. All residents in the district are stakeholders, and while the direct benefit would be to rural residents with domestic wells over the nitrate Safe Drinking Water Standard, all residents of the district would benefit from the project.

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.

While the UENRD has a documented, well-known issue with high groundwater nitrates, there are other areas of the state that possess a similar combination of high water table, sandy soils, and intense farming. Further, there are undoubtedly highly localized nitrate issues that wouldn't show up in a model that may only be discovered by chance through a program such as this. Regardless of the source, the federal nitrate drinking water standard and a multitude of other studies have linked high nitrate water consumption with birth defects, miscarriages, a multitude of cancer cases, and methemoglobinemia. Installing point of use reverse osmosis systems eliminates the risks associated with drinking water with nitrates above the Safe Drinking Water Standard. The state offered a similar program last year that resulted in 36 reverse osmosis systems installed in the UENRD, but this program differs in that it doesn't matter on our end if the well in question is registered or not-we just want to verify that it's in the district and has nitrates above the safe drinking water standard. Further, it is thought that having local contacts to facilitate the cost-share would be more well received. The project targets rural domestic wells within the UENRD that test above the 10ppm nitrate Safe Drinking Water Standard. At a cost of approximately $2250 per unit/household of approximately 2.3 persons, approximately 424 people would be provided drinking water within the nitrate Safe Drinking Water Standard via point of use reverse osmosis systems. The state would benefit in meeting the federal Safe Drinking Water Standard and reducing cancer cases while at the same time allowing the economic engine of the state, agriculture, to continue to implement improved methods of farming, that will one day be reflected in reduced nitrate groundwater levels.

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.

Any unused portion of the budget will carry over to the next year until year 5.

Entity	Year 1	Year 2	Year 3	Year 4	Year 5
WSF	$249,000	Carryover	Carryover	Carryover	Carryover
UENRD	$166,000	Carryover	Carryover	Carryover	Carryover

The UENRD contribution is from local property taxes. The $166,000 will be allotted in the UENRD FY25-26 budget provided this project is approved for WSF funding. If this project is not approved for WSF funding, it will not materialize.

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.

    By addressing the nitrate contamination for the end domestic user immediately and bringing it into Safe Drinking Water Act compliance, it is hoped that the long-term effects of the improved farming methods can be reflected in reduced nitrate contamination across the district as time progresses. The combination of more efficient practices and irrigation should reduce the nitrate concentrations within the watershed. The watersheds affected are contained within the Upper Elkhorn NRD, so it would be primarily the Elkhorn watershed, but also small parts of the Niobrara, Loup, Platte, and Missouri watersheds.

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.

    From the 2024 Department of Natural Resources Annual Report, Goal 3 is to "develop and implement customized and decentralized water management plans established through collaboration with local Natural Resources Districts and stakeholders that provide for long-term sustainability of the state's water resources." This project accomplishes just that in that it is a very custom and decentralized water management plan that will allow for sustainable use by all current users now and into the future, until such a time as the current farming practices will have reduced the need for the domestic users to utilize reverse osmosis systems.

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

    - Describe the federal mandate.
    - Provide documentary evidence of the federal mandate.
    - Describe how the project meets the requirements of the federal mandate.

- Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.

The federal Safe Drinking Water Act (42 U.S.C. §300f et seq. (1974)) sets the MCL for nitrate at 10ppm. This project takes unsafe domestic well water that has nitrates above the Safe Drinking Water Standard and reduces it to a safe level. The goal of water sustainability is to protect all current users and those in the future. This project aims to allow for the improved sustainable irrigated farming practices currently taking place to have time to be reflected in the future reduced (<10ppm) groundwater nitrate levels while at the same time protecting the current domestic groundwater users from the current elevated nitrate levels.