NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: Monroe Area Recharge Project

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

Sponsor Business Name: Lower Loup Natural Resources District

Sponsor Contact's Name: Russ Callan

Sponsor Contact's Address: 2620 Airport Drive, Ord, NE 68862

Sponsor Contact's Phone: (308) 728-3221

Sponsor Contact's Email: Rcallan@llnrd.org

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

   Grant amount requested: $ 210,000

   - If requesting less than 60 percent cost share, what percentage: N/A

   If a loan is requested amount requested: $ N/A

   - How many years repayment period? N/A
   - Supply a complete year-by-year repayment schedule. N/A

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 and Energy? N/A

- Attach a copy to your application: N/A
- What is the population served by your project? N/A
- Provide a demonstration of need: N/A
- **Do not complete the remainder of the application.**

3. **Permits Required/Obtained**

Attach a copy of each permit 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, do not have and are asking for 60 percent cost share to obtain)

G&P – T&E Consultation (required)	N/A☐	Obtained: YES☐	NO☒
NeDNR 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☒

The Lower Loup Natural Resources District (LLNRD) will conduct hydrologic, hydrogeologic, engineering, and environmental analyses to better understand the Monroe Area Recharge Study Area's water supply, water quality, and additional needs. As such, obtaining construction- and operation-related permits is not applicable. However, as part of the environmental analysis, LLNRD will review potentially jurisdictional waters of the U.S., federal and State-listed threatened and endangered species, and areas previously evaluated for and locations of documented cultural resources that are potentially eligible for listing on the National Register of Historic Places (NRHP) will be performed. These activities

will occur within 3 months of project initiation. The following describes the effort and associated cost:

- Federal and State-listed threated and endangered species
    - Access U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC)
    - Access Nebraska Game and Parks Commission (NGPC) Conservation and Environmental Review Tool (CERT)
    - Species assessment and documentation of potential effects and conservation conditions
    - Total cost – $10,000
- Review of potentially jurisdictional waters of the U.S.
    - Access National Wetland Inventory (NWI)
    - Summarize waters of the U.S. Types
    - Describe applicable Section 404 Clean Water Act (CWA) compliance pathways for potential recharge projects
    - Total cost – $10,000
- Cultural Resource Review
    - Perform Critical Issues Analysis – Access Nebraska State Historic Preservation Office (SHPO), Nebraska State Archaeology Office, and other resources as applicable
    - Develop a summary report of archeological and architectural resources, and provide recommendations for future cultural resource needs.
    - Total cost – $12,000

4. **Partnerships**

List each Partner / Co-sponsor, attach documentation of agreement:

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

At this time, LLNRD is the sole financial partner for the project (see Attachment A of the Supporting Information Attachment (SIA) – Letters of Support.

NGPC and the Loup Power District will be invited to be participating agencies in the project and will provide technical support and reviews to support alternative development and analysis.

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 total project costs are anticipated to be $350,000. LLNRD is committed to provide funding for 40 percent of the total project costs ($140,000). LLNRD's cost is allocated in their general budget.

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!

LLNRD is responsible for the development, management, utilization, and conservation of groundwater and surface water throughout the Loup River Basin, which encompasses over 5 million acres (over 10 percent of Nebraska's area) and includes Platte and Nance Counties in Nebraska. These counties are experiencing water supply resiliency issues due to a significant increase in water use, including agricultural irrigation, public supplies, industries, and hydroelectric facilities.

The purpose of the project is to better understand the current water resources in the Monroe Area Recharge Project study area (study area), identify specific areas of concern, and evaluate mitigation alternatives that will sustain agriculture, keep water in the Lower Loup Basin, and provide other benefits, such as enhanced environmental habitat and river baseflows.

The study area is located in Platte and Nance counties, encompassing the Village of Monroe just west of Columbus. The study area is approximately 58.6 square miles, with a primary focus area encompassing 36.3 square miles, and is shown in Attachment B of the Supporting Information Attachment (SIA). Agriculture is both economically and ecologically important to the region, and the study area includes approximately 19,000 irrigated acres. Measures must be taken to manage or replace depletions for a sustainable water supply.

In support of the LLNRD Voluntary Integrated Management Plan (LLNRD 2016), the proposed project would identify and evaluate groundwater recharge alternatives that would help mitigate the impacts of groundwater depletions to achieve and secure a more reliable, long-term water source. Groundwater use is a critical issue in the Lower Loup Basin, where agricultural producers and domestic users in the LLNRD rely on it as the primary source. The proposed project focuses on improving water supply reliability for all stakeholders.

A robust stakeholder engagement effort will be conducted to identify potential water supply and market stakeholders to fully understand the problems and opportunities within the study area. LLNRD will conduct hydrologic, hydrogeologic, engineering, and environmental analyses to better understand the

study area's water supply, water quality, and additional needs. The study will develop a project-area-specific groundwater model to identify potential recharge opportunities, compare alternatives, and prioritize project concepts.

The project's anticipated outcome is a Water Strategy Plan that summarizes the results of the study and provides an implementation plan for moving forward with recharge project concepts. LLNRD will be the lead agency for the project and will lead the overall effort.

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):

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

Anticipated Project Timeline: The estimated schedule anticipates completing the project within 36 months of the funding date. Prior planning work completed by LLNRD will be integrated into the scoping and planning elements.

Table A-1. Project tasks and expenditures per year

Tasks	Year 1$	Year 2$	Year 3$	Total $ Amt.
Outreach/Partnership Building	$19,000	$14,625	$19,375	$53,000
Analysis, Scoping, and Planning Activities	$82,500	$133,500	$37,500	$253,500
Water Strategy Document and Final Project Report			$22,000	$95,000
Project Management and Grant Administration	$7,167	$7,167	$7,167	$21,500
			TOTAL	$350,000

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.

NeDNR 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: N/A

1.A.2 Describe the plan of development (004.01 A): N/A

1.A.3 Include a description of all field investigations made to substantiate the feasibility report (004.01 B): N/A

1.A.4 Provide maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C): N/A

1.A.5 Describe any necessary water and/or land rights, including pertinent water supply and water quality information (004.01 D): N/A

1.A.6 Discuss each component of the final plan (004.01 E): N/A

1.A.7 When applicable, include the geologic investigation required for the project (004.01 E 1): N/A

1.A.8 When applicable, include the hydrologic data investigation required for the project (004.01 E 2): N/A

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): N/A

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

1.B.1 Insert data necessary to establish technical feasibility (004.02):

Datasets will be used to develop a model for quantifying annual recharge potential and annual watershed yield, improving spatial resolution and accuracy of recharge potential, or identifying and prioritizing recharge areas. Datasets include:

- Land surface topography (LiDAR)
- Aquifer Saturated Thickness (AEM data)
- Aquifer Transmissivity (AEM data)
- Certified Irrigated Acres (LLNRD)
- Surface Water Allocations (NeDNR)
- Topographic regions map (CSD)
- Land use/Land cover data (CSD, USGS)
- Soils data (STATSGO)
- Bedrock geology map (CSD)
- Lithology and/or stratigraphy from registered wells and test hole geologic logs (CSD and NeDNR)
- National Hydrographic Dataset (NHD) data
- Water table data (LLNRD, CSD, USGS)
- Water table change maps (CSD)
- Climatic station data and derived information (e.g., precipitation, evapotranspiration [ET])
- CropSIM gridded water budget data (e.g., precipitation, ET, soil hydraulic parameters, root zone drainage, surface runoff)
- Streamflow gage records (USGS)
- Fine-resolution soils data (SSURGO)
- Refined climate data (e.g. NeRAIN, NEXRAD rainfall)
- Gridded MODIS-based recharge data (CSD)
- NeDNR dam inventory
- Parcel ownership data
- Aerial/satellite imagery
- National Wetlands Inventory (NWI) data

1.B.2 Discuss the plan of development (004.02 A):

The plan of development includes three primary tasks. These tasks are summarized as follows (see Attachment C of the SIA for a detailed scope of work):

Task 1 – Outreach and Partnership Building. LLNRD will undertake a robust effort to inform and obtain input from stakeholders within the study area. A Public Engagement Plan will be developed. The plan will describe how to engage the public and stakeholders, outline the level of involvement, and establish when public comment will occur throughout the course of the project. Stakeholder outreach will be conducted per the Public Engagement Plan to identify potential water supply and water market stakeholders, including irrigation districts, well

owners/users, hydroelectric power generators, environmental interests, recreational interests, municipalities, industrial users, and conservation partners. A broader outreach effort will be conducted with State agencies and other interested parties to share lessons learned that can further Nebraska's recharge efforts. Participants in these meetings may include the Nebraska Department of Natural Resources, Nebraska Public Power District, Loup Public Power District, Natural Resources Districts, and other parties seeking to develop and use recharge in Nebraska.

Task 2 – Analyses, Scoping, and Planning Activities. Analyses, scoping, and planning activities are needed to support the development of a future water recharge project. This task includes assembling available datasets and preparing them for inclusion into an ArcGIS-format database.

Using this data, LLNRD will develop a three-dimensional (3D) subsurface model that will be used to evaluate potential recharge rates, identify potential recharge sites, and prioritize identified sites within LLNRD groundwater management subareas. Datasets will be complied and used to quantify annual recharge potential and annual watershed yield, improve spatial resolution and accuracy of recharge potential, and identify and prioritize recharge areas. See 1.B.1 for a list of data sets to be compiled.

A recharge ranking matrix will be developed to identify the key criteria for prioritizing potential recharge sites and will be developed using technical factors and information gained through stakeholder engagement.

Potential recharge rates will be evaluated using distributed/gridded recharge rates, including nominal rates and relative potential rates from the various data sources. Based on this analysis, annual watershed yield will be estimated using watershed yield estimates from current models with refinements based on climatic conditions, soil texture, and/or available stream gauging information.

A detailed evaluation of the thickness of the unsaturated zone (depth to water table) and thickness of silt and clay layers will be completed and used to develop a classification index of the relative likelihood and timing for deep percolating water to reach the water table and become recharge.

All previous sub-tasks will be used to develop an overall water budget. The water budget will include an assessment of the availability of surface or groundwater, the availability of future water supplies using climate change projections, and current and future water demands for relevant water uses. A 3D subsurface model will be developed, and assessments of wetlands, geotechnical considerations, and regulated floodplains will be performed.

Task 3 – Development of a Water Strategy Plan and Final Project Report. A written water strategy document will be completed and included with the final performance report. The report will include a summary of stakeholder outreach, statement of purpose and need, discussion of project opportunities, comparison of alternatives (including costs and benefits), discussion of an implementation strategy (including legal and permitting needs), discussions of lessons learned, and a project evaluation tool.

1.B.3 Describe field or research investigations utilized to substantiate the project conception (004.02 B):
A vast array of water supply and historical use data is available for the Lower Loup Basin. NeDNR has a database that contains hydrologic information, including historical surface water and groundwater diversions, irrigated acreage, cropping patterns, irrigation practices, groundwater stream depletions, historical consumptive use, and return flows. In addition, NeDNR has regional groundwater models of the state that can be used for the boundary conditions of a local model. The data is available to LLNRD and is currently being used for initial project scoping.

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

No water or land rights are needed for the project.

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):

The Water Strategy Plan will not impact the development and/or operation of existing or envisioned structural measures. The implementation strategy in the Plan will identify potential groundwater recharge projects that would improve the sustainability of groundwater and surface water resources and therefore the related operation of associated structural measures.

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.

The project will build upon the existing NeDNR regional groundwater models. This will include the development of a 3D subsurface model that will be used to define an overall water budget, including assessment of the availability of surface or groundwater, the availability of future water supplies using climate change projections, and current and future water demands for relevant water uses.

An alternative to building upon this model would be to use the existing regional models only. The regional models, while suitable for the boundary conditions of a localized model, would not have the sensitivity to effectively quantify annual recharge potential and annual watershed yield at the project area scale and therefore would not provide for spatial resolution and accuracy of recharge potential.

Should this project not go forward, and groundwater declines continue, additional wellfield development could be required. During drought conditions, private wells in the area may become inoperable, cost more to operate, or need to be drilled deeper. Administration via regulation may need to be employed long-term if the project is not implemented.

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 dollar values and other units of measurement when appropriate (e.g., environmental, social, cultural, data improvement). The analysis period for economic feasibility studies is the project life. (Title 261, CH 2 – 005).

   The estimated total cost of the project ($350,000) is based on the costs of developing similar regional models and associated management plans. The basis for the costs is associated with the time and materials to complete similar projects. The following is a detailed breakdown of tasks and associated costs per the detailed scope of work provided in Attachment C of the SIA:

Table B-1. Tasks and associated costs

Task	Labor Hours	Labor Costs	Expenses	Total Cost
1 – Outreach and Partnership Building				
1.1 – Public Engagement Plan	80	$14,000	$5,000	$19,000
1.2 – Stakeholder Outreach	100	$17,500	$2,000	$19,500
1.3 – Draft Strategy Document	80	$14,000	$500	$14,500
2 – Analyses, Scoping and Planning				
2.1 – Technical Analyses	800	$160,000	$5,000	$165,000
2.2 – Water Rights Analyses	80	$16,000	$1,000	$17,000
2.3 – Research of Legal Institutional Requirements	80	$16,000	$1,000	$17,000
2.4 – Decision Support Tools	80	$16,000	$1,000	$17,000

Task	Labor Hours	Labor Costs	Expenses	Total Cost
2.5 – Development and Comparison of Project Alts.	80	$16,000	$500	$16,500
2.6 – Implementation Plan	100	$20,000	$1,000	$21,000
3 – Development of a Water Strategy Document and Final Report	120	$21,000	$1,000	$22,000
4 – Project Management and Grant Administration	120	$21,000	$500	$21,500
Total	**1,720**	**$331,500**	**$18,500**	**$350,000**

The project's primary benefit is the identification of recharge projects that will successfully address the declines in groundwater levels that are happening in the area. Through implementation of recharge projects, water can be returned directly back to the aquifer, creating a more sustainable groundwater resource that enhances drought resilience. The project will address a problem that is challenging water managers across the United States—how to maintain or increase water levels in the country's aquifers without reducing necessary use. In addition, year-round recharge will enhance aquifer storage in the area, ensuring a stable aquifer. This stable aquifer will also sustain baseflow contributions during drought periods.

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).

All costs for this project will provide for contracted professional services responsible for implementation of the plan of development (see 1.B.2).

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).

As a planning study, no method for monetizing benefits from this project exists. The purpose of the project is to better understand the current water resources in the Monroe Area Recharge Project study area, identify specific areas of concern, and evaluate mitigation alternatives that will sustain agriculture, keep water in the basin, and provide other benefits, such as enhanced environmental habitat and

river baseflows. The project's benefits include identifying recharge projects that will successfully address the groundwater level declines happening in the area and creating a more sustainable groundwater resource that enhances drought resilience.

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).

The total cost of the project ($350,000) will occur over a 36-month period. The cost cash flow by year is provided below:

Table B-2. Cost cash flow by year

Year	WSF	LLNRD	Total
1	$65,200	$43,467	$108,667
2	$93,175	$62,117	$155,292
3	$51,625	$34,417	$86,042
Total	$210,000	$140,000	$350,000

As described in 3.B, monetized benefits cannot be calculated at this time.

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 total project cost is $350,000 and is anticipated to be allocated per 3.C above.

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.

LLNRD has allocated funds for this study. Letters of support from LLNRD are provided in Attachment A of the SIA. The table below lists the 2023–2024 property tax levies, valuations, and sources of revenue for the LLNRD (Nebraska Auditor of Public Accounts https://www.nebraska.gov/auditor/reports/index.cgi?budget=1-; accessed March 6, 2025).

Table B-3. Lower Loup Natural Resources District – Accounts

Tax Levy (per $100 valuation)	Valuation 2023–2024	Total Available Resources	Local Match for Proposed Project
3.6169	$18,067,263,121	$19,886,527	$140,000

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).

   Not 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.

   No loan is being requested.

7. Describe how the plan of development minimizes impacts on the natural environment (i.e. timing vs nesting/migration, etc.).

   The plan of development culminates in a Water Strategy Plan. No land disturbing activities will occur as a result of the Plan. The Plan will include environmental resources as part of recharge site analysis and will include future environmental compliance and conservation measures that would be included as part of implementation.

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

   LLNRD is a regional government agency that focuses on protecting ground and surface water, reducing flood threats, slowing the effect of soil erosion, creating and enhancing wildlife habitat, and more. Nebraska State Statute Chapter 2, Article 32, and the Groundwater Management and Protection Act, Chapter 46, Article 7, assigns the responsibility of protecting and maintaining the quality and quantity of groundwater for municipal, domestic, and agricultural uses to Nebraska's Natural Resources.

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

   The State of Nebraska's Drought Mitigation and Response Plan (included within Attachment E of the SIA) was developed in response to severe droughts and highlighted the need to create continuity between various water administration agencies. The current state drought plan places greater emphasis on mitigating drought effects and was developed by multiple stakeholders including:

- Nebraska Department of Agriculture,
- Nebraska Department of Natural Resources,
- Nebraska Health and Human Services System,
- Nebraska Emergency Management Agency,
- University of Nebraska Cooperative Extension Service,
- University of Nebraska Conservation and Survey Division,
- Livestock producers,
- Crop producers,
- Governor's Policy Research Office.

Nebraska's revised drought plan places more emphasis on mitigation. Mitigation is defined as short- and long-term actions, programs, or policies implemented during and in advance of drought that reduce the degree of risk to human life, property, and productive capacity. The types or forms of mitigation activities vary from one natural hazard to another. Drought-related mitigation actions are different from those used for other natural hazards because of the insidious nature of drought. Mitigation projects, such as this, are proactive and much more economical than response actions.

LLNRD has, and is, undertaking planning efforts to mitigate the effects of drought. LLNRD's planning includes many of the elements of a drought contingency plan. The table below provides a summary of the existing plans to address water management and drought mitigation planning, along with the periodic scheduled updates and/or reviews of those plans.

Table B-4. Existing plans

Name of Plan	Most Recent Update
State of Nebraska Drought Mitigation & Response Plan	2000
LLNRD Voluntary Integrated Management Plan (IMP)	2016
Lower Platte River Basin-Wide Plan	2017/2022
Spring Static Water Level Monitoring Program	2022
Multi-Jurisdictional Hazard Mitigation Plan	2022
LLNRD Master Plan (2012-2022)	2022
Groundwater Management Plan	1985

Several of the LLNRD Voluntary Integrated Management Plan (IMP) goals are addressed with this project:

Goal 2: Implement this water management plan to maintain an efficient and economical balance between current and future water supplies and demands. Objective 2.1: Collaborate with State and local governments to identify

opportunities to augment water supplies within the district and, if necessary, identify opportunities to supplement with imported water from outside LLNRD.

This project achieves this goal by working collaboratively with local governments (Nance and Platte County) to address water supply shortages and maintain and efficient and economical balance between current users and future demands within LLNRD.

Goal 3: Develop and implement water use policies and practices that prioritize and contribute to the protection of existing surface and groundwater uses while allowing for future water development. Objective 3.1: Identify available water storage opportunities throughout LLNRD.

A recharge project would be a mitigation opportunity that would recharge water and protect existing water uses while allowing for future development. It would meet a primary focus of Nebraska's Drought Mitigation and Response Plan of mitigating existing and future effects on water supplies affected by climate change and drought (see Attachment E of the SIA). The proposed project could restore groundwater levels that have declined, even in wet periods, so that a water supply buffer will be developed to protect water supplies in times of drought. Correspondingly, the stored supplies will provide buffer against the expected effects of climate change.

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. N/A

10.B Attach proof of ownership for each easement, right-of-way and fee title currently held. N/A

10.C Provide assurance that you can hold or can acquire title to all lands not currently held. N/A

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

Nebraska State Statute Chapter 2, Article 32, and the Groundwater Management and Protection Act, Chapter 46, Article 7, assigns the responsibility of protecting and maintaining the quality and quantity of groundwater for municipal, domestic, and agricultural uses to Nebraska's Natural Resources.

12. Identify the probable consequences (environmental and ecological) that may result if the project is or is not completed.

No environmental or ecological consequences will occur as a result of this project.

Section C.

NRC SCORING

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

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0 to 6 for items (1) through (9); and 0 to 3 for items (10) through (15). Two additional points will be awarded to projects that 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 that 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 criterion 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 that 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:

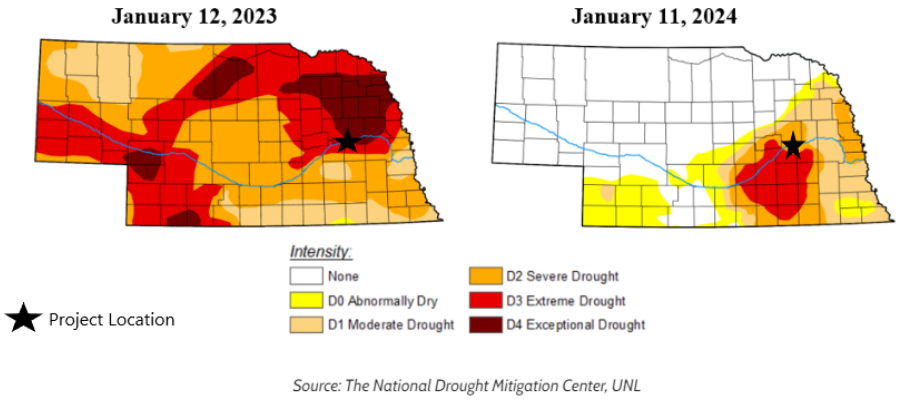
    - Describe the specific threats to drinking water the project will address.
    - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
    - Provide a history of issues and tried solutions.
    - Provide detail regarding long-range impacts if issues are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

    Groundwater use is a critical issue in the Lower Loup Basin, where agricultural producers and domestic users in LLNRD rely on it as the primary water source.

The proposed project focuses on improving water supply reliability for all stakeholders.

The state of Nebraska experienced wide-spread drought during 2022 and into 2023, as shown in the figure below indicating the resulting drought conditions the following year. This drought was the result of the hottest and driest year on record in the state. In addition, this drought followed on the heels of an extremely wet period and the abrupt turn-around in water supply conditions was unprecedented. Loup River water supplies have historically been variable, but recent indications are that this variability may be becoming more extreme. These extreme fluctuations necessitate development of additional mitigation measures to prepare for increasing droughts and improvements in response actions and inter-agency coordination during these future droughts to ensure critical water supplies are available.

Figure C-1. Drought in Nebraska 2022–2023



Source: The National Drought Mitigation Center, UNL

The community of Monroe uses groundwater as the source for their community water supply. The community of Monroe has a population of approximately 300 people (US Census Bureau 2020). The community of Monroe also has a Nebraska Department of Environment and Energy (NDEE)-designated wellhead protection area (WHPA) within the study area. The WHPA is at risk of both water availability limits, especially during times of drought, and quality threats, specifically nitrate-nitrogen derived from row-crop agriculture. Studies have shown that providing a reliable water source can dilute nitrates in the vadose zone, thereby lowering the risk of nitrate contamination on the community well site.

In addition to the community of Monroe, the study area contains 580 registered wells (225 are used for irrigation) and 943 people. Groundwater is the water source for these wells and individuals.

The project is the first step in identifying potential recharge sites that would create a more sustainable groundwater resource that enhances drought

resilience. Should this project not go forward, and groundwater declines continue, additional wellfield development could be required. During drought conditions, private wells in the area may become inoperable, cost more to operate, or need to be drilled deeper. Administration via regulation may need to be employed long-term if the project is not implemented.

2. Meets the goals and objectives of an approved Integrated Management Plan or Groundwater 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.

    Several of the LLNRD Voluntary Integrated Management Plan (IMP) goals are addressed with this project:

    Goal 2: Implement this water management plan to maintain an efficient and economical balance between current and future water supplies and demands. Objective 2.1: Collaborate with state and local governments to identify opportunities to augment water supplies within the district and, if necessary, identify opportunities to supplement with imported water from outside the District.

    This project achieves this goal by working collaboratively with local governments (Nance and Platte County) to address water supply shortages and maintain an efficient and economical balance between current users and future demands within LLNRD.

    Goal 3: Develop and implement water use policies and practices that prioritize and contribute to the protection of existing surface and groundwater uses while allowing for future water development. Objective 3.1: Identify available water storage opportunities throughout LLNRD.

    A recharge project is a mitigation opportunity that would recharge water and protect existing water uses while allowing for future development. It would meet a primary focus of Nebraska's Drought Mitigation and Response Plan of mitigating existing and future effects on water supplies affected by climate change and drought (see Attachment D of the SIA). The proposed project could restore groundwater levels that have declined, even in wet periods, so that a water supply buffer will be developed to protect water supplies in times of drought. Correspondingly, the stored supplies will provide a buffer against the expected effects of climate change.

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

List the following information that is applicable:

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

The project will allow regional partners and stakeholders to develop strategies to implement water resiliency initiatives on a local and regional scale. The study will identify numerous potential opportunities for recharge projects in the basin, including the potential of using wetlands and creek channels as recharge locations to minimize the impact on adjacent landowners. The project's goal is to understand the current water resources in the area and determine the effects of drought and climate on these resources. A robust analysis will be performed, including a water budget and groundwater model, to evaluate the continued effect of declining water levels with particular focus on drought conditions. The analysis will evaluate the effect of recharge projects to mitigate drought conditions, both with and without recharge project operation.

A successfully implemented project will address the declines in groundwater levels happening in the area. By returning water directly back to the aquifer, the project creates a more sustainable groundwater resource that enhances drought resilience. It solves a problem that is challenging water managers across the United States—how to maintain or increase water levels in the country's aquifers without reducing necessary use. The project will create improved groundwater levels and reduce declines in the aquifer. In addition, year-round recharge enhances aquifer storage in the area ensuring a stable aquifer.

This project focuses specifically on mitigating the current effects of water shortages and the compounding effects of drought and climate change on those water resources. Without this recharge project, a sustainable water supply may not be achieved without regulation from LLNRD.

The project has cross-basin benefits in terms of identifying recharge alternatives that create a stable aquifer that will sustain baseflow contributions during drought periods. Sustained baseflow contributions will provide in-stream benefits not only to the Loup River and tributaries within the study area, but also for the lower Platte River.

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

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

The Lower Loup NRD Drought Management Plan (2022), as included in Attachment F of the SIA, specifically discusses threats to water supply, threats to water quality, and potential responses due to drought conditions.

In addition, the State of Nebraska's Drought Mitigation and Response Plan (Attachment E of the SIA) was developed in response to severe droughts and highlights the need to create continuity between various water administration agencies. The current state drought plan places greater emphasis on mitigating drought effects and was developed by multiple stakeholders including:

- Nebraska Department of Agriculture,
- Nebraska Department of Natural Resources,
- Nebraska Health and Human Services System,
- Nebraska Emergency Management Agency,
- University of Nebraska Cooperative Extension Service,
- University of Nebraska Conservation and Survey Division,
- Livestock producers,
- Crop producers,
- Governor's Policy Research Office.

Nebraska's revised drought plan places more emphasis on mitigation. Mitigation is defined as short- and long-term actions, programs, or policies implemented during and in advance of drought that reduce the degree of risk to human life, property, and productive capacity. The types or forms of mitigation activities vary from one natural hazard to another. Drought-related mitigation actions are different from those used for other natural hazards because of the insidious nature of drought. Mitigation projects, such as this, are much more proactive and economical than response actions.

LLNRD has, and is, undertaking planning efforts that mitigate the effects of drought. LLNRD's planning includes many of the elements of a drought contingency plan. The table below contains a summary of the existing plans to address water management and drought mitigation planning, along with the periodic scheduled updates and/or reviews of those plans.

Table C-1. Existing plans

Name of Plan	Most Recent Update
State of Nebraska Drought Mitigation & Response Plan	2000
LLNRD Voluntary Integrated Management Plan (IMP)	2016
Lower Platte River Basin-Wide Plan	2017/2022
Spring Static Water Level Monitoring Program	2022
Multi-Jurisdictional Hazard Mitigation Plan	2022
LLNRD Master Plan (2012-2022)	2022
Groundwater Management Plan	1985

Implementation of the recharge alternatives identified as part of the project will also benefit wildlife habitat and conservation. There are several local wetlands and streams in the area that will be evaluated for use in providing recharge water to the aquifer. LLNRD has successfully used streams in the past as a recharge source. Once such instance is Lost Creek in nearby Columbus, Nebraska, as part of the Columbus Recharge Project. Using a local groundwater model and subsurface information, LLNRD determined that the infiltration capacity of Lost Creek would be more than sufficient to transfer surface water to groundwater. Based on annual monitoring, LLNRD has determined the Lost Creek channel is infiltrating water into the aquifer at greater than 90% efficiency. The environmental benefits of using Lost Creek have also resulted in a significant increase in native plant growth and native bird use.

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 on the state's residents.

    The project's goal is to better understand the current water resources in the study area, identify specific areas of concern, and evaluate mitigation alternatives that will sustain agriculture, keep water in the Basin, and provide other benefits, such as enhanced environmental habitat and river baseflows. In addition, LLNRD will use outreach and partnership-building to educate stakeholders. Ultimately, this project will develop a sustainable water supply that mitigates groundwater declines and increases water supply reliability, with specific resiliency during times of drought.

Implementation of the recharge alternatives that will be identify in the Water Strategy Plan would increase baseflow in the Lower Platte River, particularly during drought conditions. The project will operate during drought and non-drought conditions; therefore, the impact from drought will not be as detrimental. Increases in baseflow will benefit upstream appropriators, including the Bureau of Reclamation's North Loup Division. In addition, increases in baseflow will decrease the potential for an appropriator with priority to make a call on the river.

6. Is cost-effective:

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

The total cost of the project ($350,000) will occur over a 36-month period. The cost per year is shown below:

Table C-2. Project cost per year

Tasks	Year 1$	Year 2$	Year 3$	Total $ Amt.
Outreach/Partnership Building	$19,000	$14,625	$19,375	$53,000
Analysis, Scoping, and Planning Activities	$82,500	$133,500	37,500	$253,500
Water Strategy Document and Final Project Report			$22,000	$22,000
Project Management and Grant Administration	$7,167	$7,167	$7,167	$21,500
			TOTAL	$350,000

The LLNRD Aquifer Framework Mapping WSF project (Application #4144) provided funding to obtain airborne electromagnetic surveys. This project would use the products obtained from that expenditure of state funds.

Alternatives to building upon this model would be to use the existing regional models only. The regional models, while suitable for the boundary conditions of a local model, would not have the sensitivity to effectively quantify annual recharge potential and annual watershed yield and therefore would not provide the spatial resolution and accuracy of recharge potential.

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 study area is downstream of the Platte River Recovery and Implementation Program (PRRIP). This Department of Interior initiative is an interstate agreement with key governance members from Colorado, Wyoming, Nebraska, the Fish and Wildlife Service, and the Bureau of Reclamation. The PRRIP's goals are aimed at supporting the recovery of endangered species in the Central Platte while also ensuring the downstream habitat (Lower Platte) for pallid sturgeon is not impacted negatively. The Consortium's efforts will focus on improving low flow conditions within the Lower Platte River in a manner that does not seek to impact the Central Platte River and should provide additional baseline habitat during drought periods that support the PRRIP's objectives.

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.

    Groundwater use is a critical issue in the Lower Loup Basin, where agricultural producers and domestic users in LLNRD rely on it as the primary water source. The proposed project focuses on improving water supply reliability for all stakeholders.

    During drought conditions, private wells in the area may become inoperable, cost more to operate, or need to be drilled deeper. Administration via regulation may be needed to offset additional regulatory constraints that would be required on agricultural irrigation wells during times of drought, thereby impacting the economic potential of the agricultural industry in the area. Additional regulations include tightened restrictions on irrigation allocations on all area irrigation wells.

The project will develop a localized groundwater model. The model, with incorporation of a geotechnical investigation along with the existing Aerial Electromagnetic survey, will provide a detailed representation of aquifer properties and assure more accurate recharge volumes can be used when applying potential recharge alternatives. The model will allow LLNRD to implement conjunctive management strategies that are more tolerable to the public instead of forced regulations. The model will also give LLNRD a better idea of potential impacts of the pumping totals throughout the area, because all of the agricultural irrigation wells in the vicinity will be metered by February 2026.

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 community of Monroe also has an NDEE-designated WHPA within the study area. The WHPA is at risk of both limits on water availability, especially during times of drought, and quality threats, specifically nitrate-nitrogen derived from row-crop agriculture. Studies have shown that providing a reliable water source can dilute nitrates in the vadose zone, thereby lowering the risk of nitrate contamination on the community well site.

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.

    LLNRD has allocated funds for this study. Letters of support from LLNRD are provided in Attachment A of the SIA. The table below lists the 2023-2024 property tax levies, valuations, and sources of revenue for the LLNRD (Nebraska Auditor of Public Accounts https://www.nebraska.gov/auditor/reports/index.cgi?budget=1- accessed March 6, 2025).

Table C-3. Lower Loup Natural Resources District – Accounts

Tax Levy (per $100 valuation)	Valuation 2023-2024	Total Available Resources	Local Match for Proposed Project
3.6169	$18,067,263,121	$19,886,527	$140,000

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 the project.
    - Identify who benefits from this project.

    LLNRD has developed a Voluntary Integrated Management Plan. This project supports this plan, as described in Criteria #2 above.

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.

    Across Nebraska, water supply resiliency issues are a statewide problem being addressed through collaboration with the NeDNR, Natural Resources, Districts, and stakeholders. LLNRD is responsible for the development, management, utilization, and conservation of groundwater and surface water throughout the Loup River Basin, which includes over 5 million acres (over 10 percent of Nebraska's area) and includes Platte and Nance Counties in Nebraska. These counties are experiencing water supply resiliency issues due to a significant increase in water use, including agricultural irrigation, public supplies, industries, and hydroelectric facilities.

    Agriculture is a major industry and economic driver within LLNRD, and continued droughts will cause significant economic impacts. The State of Nebraska's economic status is heavily influenced by the LLNRD region, with agricultural

production in the area (approximately 19,000 acres) accounting for over $4.5 billion of the state's economy, according to the 2017 US Census of Agriculture.

This project would provide a better understanding of the current water resources in the Monroe area, identify specific areas of concern, and evaluate mitigation alternatives that will sustain agriculture, keep water in the Basin, and provide other benefits, such as enhanced environmental habitat and river baseflows.

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.

    LLNRD is fully committed to the funding needed ($140,000) to match the Nebraska Water Sustainability Fund grant proposed in this application.

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.

    Watershed health and function can be related to the ability to sustain natural processes and habitats. The following are elements of watershed health and function and how the project will contribute to their sustainability:

    - Groundwater quality – The project will identify recharge sites that will recharge the aquifer effectively. Providing a reliable water source can dilute nitrates in the vadose zone, thereby lowering the risk of nitrate contamination.
    - Surface water quality – The project will identify recharge sites that enhance baseflow of surface water sources. Increased baseflow is desirable to address high water temperatures. In addition, wetlands and streams considered for recharge sites also create opportunities to slow/detain surface water runoff during precipitation events. This allows for the capture/detention of sedimentation and nutrient loading by allowing removal of excess nutrients, thereby improving surface water quality.
    - Natural habitats and processes:
        - There are also threats to fish and wildlife in the basin due to the loss of base flows during drought conditions. Loss of base flows decreases

food sources (minnows and macroinvertebrates) for the State-listed endangered least tern and federally listed threatened piping plover. Improvements in base flows would minimize the risk of fish kills due to stranding, high water temperatures, and/or loss of oxygenated water.
    - Wetlands used as recharge sites will increase habitats associated with emergent wetland systems.
    - Maintenance and/or increases in baseflow will support existing riparian habitats.
    - Aquifer recharge will sustain natural seeps and/or groundwater supported wetland habitats.

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

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

    The 2024 Nebraska Department of Natural Resources 2024 Annual Report defines six strategic goals. The following describes how the proposed project would meet these goals:

    Goal 1 – Establish strong State leadership, involvement, and support for science-based decision-making that is necessary to sustain state and local water management outcomes.

    LLNRD, as the project sponsor, will provide leadership during project implementation. LLNRD's mission includes implementing collaborative efforts to preserve the ecological balance and vitality of the region they serve. This project uses science-based decision-making combined with collaboration from State and local stakeholders to evaluate recharge opportunities to ensure a sustainable and resilient resource and environment. A 3D subsurface model will be developed to define an overall water budget, including assessment of the availability of surface or groundwater, the availability of future water supplies using climate change projections, and assessment of current and future water demands for relevant water uses.

    Goal 3 – 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.

    The Water Strategy Plan that will be developed as part of this project reflects a customized planning effort to gain a thorough understanding of the groundwater resources, specific areas of concern, and options to balance water use and the

natural environment for long-term sustainability. The project's outcome will provide a better understanding of the current water resources in the area and determine the effect of drought and climate change on these resources. Stakeholder collaboration and input are key.

Goal 4 – Encourage strong public engagement with multiple constituents and stakeholder groups in planning and implementation activities to ensure that local and State needs are addressed.

The project includes a robust stakeholder communication effort throughout the duration of the project. Beginning with a Public Engagement Plan that will describe the outreach effort through the project, stakeholder outreach will occur to engage potential water supply and water market stakeholders, including irrigation districts, well owners/users, hydroelectric power generators, environmental interests, recreational interests, municipalities, industrial users, and conservation partners. In addition, at project conclusion, the project team will meet with State agencies and other interested parties to share lessons learned that can further Nebraska's recharge efforts. Participants in these meetings may include the Nebraska Department of Natural Resources, Nebraska Public Power District, Loup Public Power District, Natural Resources Districts, and other parties seeking to develop and use recharge in Nebraska.

Goal 5 – Protect existing water uses through collaborative investments in water resource projects, planning, administration, and permitting of surface water rights, and the registration of groundwater wells.

The project, through the development of a detailed groundwater model, will provide a better understanding of groundwater pumping totals throughout the area, because all of the agricultural irrigation wells will be metered by February 2026. This understanding, combined with incorporation of potential recharge projects, will result in potential offsets of additional regulatory constraints that would be required during times of drought on agricultural irrigation wells, thereby impacting the economic potential of the agricultural industry in the area.

Goal 6 – Provide agency-wide services and support in the areas of information technology and transparent data sharing, business improvement, public information, and administration of state-aid funds in conjunction with the Natural Resources Commission.

This project will provide information technology and data sharing with all stakeholders through the development of an area-specific groundwater model. This project will allow regional partners and stakeholders to develop strategies to implement water resiliency initiatives on a local and regional scale.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate that 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.

No federal mandates are associated with this project.