

# NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

## Section A.

### ADMINISTRATIVE

PROJECT NAME: Village of Malcolm Aquifer Sustainability Assessment

#### *PRIMARY CONTACT INFORMATION*

Entity Name: Village of Malcolm

Contact Name: David Rohe - Village Board Chairperson

Address: 137 East 2<sup>nd</sup> / P.O. Box 228 / Malcolm, NE 68402

Phone: (402) 796-2250

Email: malcolmne@msn.com

Partners / Co-sponsors, if any: Lower Platte South Natural Resource District (LPSNRD)

1. Dollar amounts requested: \$25,000

Grant amount requested. \$25,000

Loan amount requested. \$ N/A

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

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

Are you requesting less than 60% cost share from the fund? NO

If so what % ? N/A

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

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

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

YES  NO

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

N/A  
YES  NO

If yes attach a copy to your application.

If yes what is the population served by your project?

If yes provide a demonstration of need.

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

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

N/A  YES  NO

LPSNRD has an approved Integrated Management Plan(IMP) in place that includes the Malcolm area.

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

YES  NO

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

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

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

## Section B.

### DNR DIRECTOR'S FINDINGS

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

YES  NO

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

A discussion of the plan of development (004.01 A);

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

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

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

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

Required geologic investigation (004.01 E 1);

Required hydrologic data (004.01 E 2);

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

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

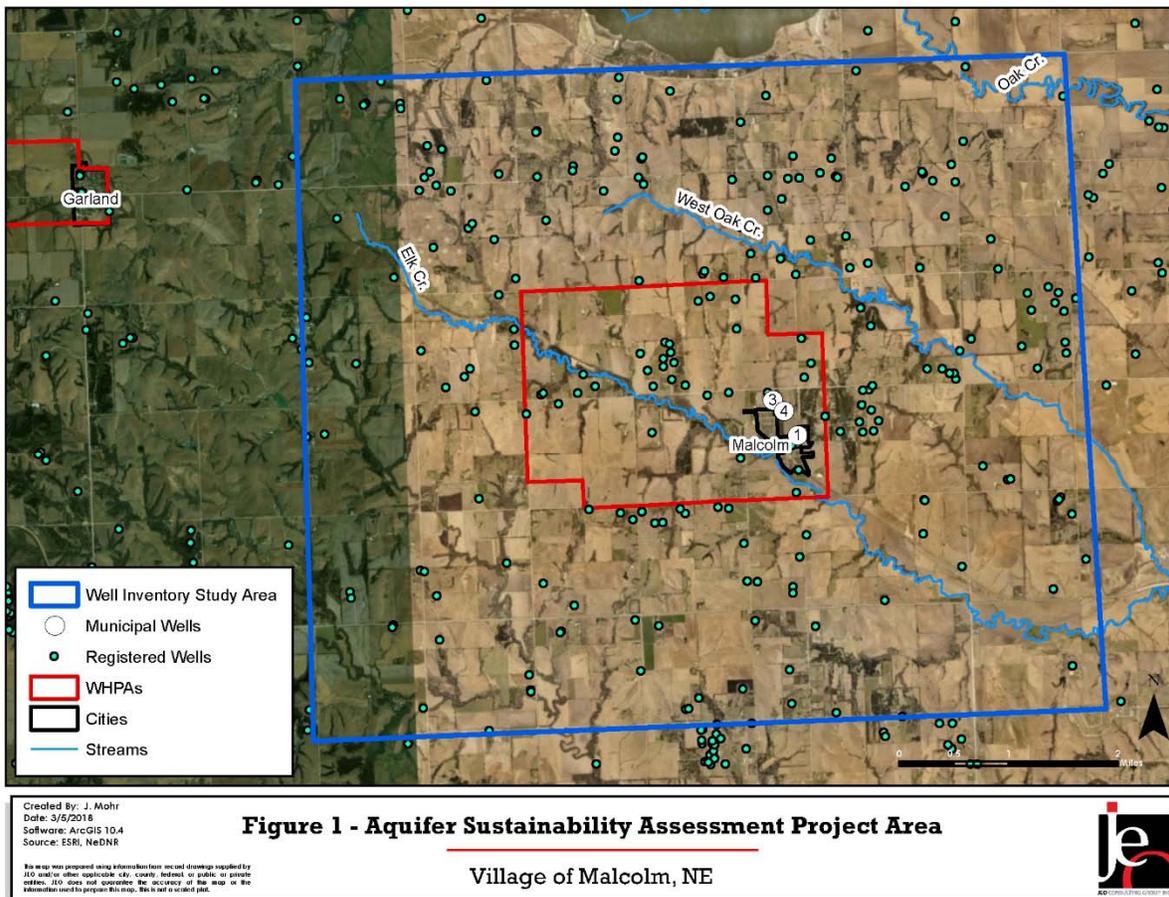
A discussion of the plan of development (004.02 A);

The Village of Malcom (Village), Nebraska is requesting \$25,000 from the Nebraska Water Sustainability Fund to cost-share the Malcolm Aquifer Sustainability Assessment. The purpose of the Assessment is to:

- 1) Better understand of the physical characteristics of the aquifer for an area two miles around the Village's existing WHP area (Study Area),
- 2) Estimate the storage capacity of the aquifer in the Study Area and yield of the existing well field to supply the surrounding area,
- 3) Identify potential targets areas for future exploration and well field expansion,
- 4) Complete a map showing the theoretical drawdown (i.e. water level decline) using an analytical model and based on current and future pumping demands; and,
- 5) Qualitatively assess the vulnerability of the aquifer to potential surface contaminant sources.

The assessment will be used by the Village Board of Trustees and Planning Commission when making decisions related to the growth of the community. The need for the Assessment took on heightened importance during an update of the Village's Wellhead Protection Plan and subsequent update of the Wellhead Protection Area by the Nebraska Department of Environmental Quality (NDEQ). During this time the Village Board learned that the aquifer that serves as a source water supply for the community was thought to be limited in nature. This news was coupled with a rising demand for residential development in and around the Village. Therefore, the Village Board decided to take a proactive approach to better understand the aquifer capacity to meet future demands and the vulnerability of this source to over-development.

The Village has recently updated components of their water system Preliminary Engineering Report, which concluded that the water system and Village supply wells are mostly adequate; the only remaining concern was not having a good understanding of the aquifer's storage and well-field capacity. To address this data gap, the initial step in understanding the hydraulic properties of the aquifer, is to develop a conceptual hydrogeologic model or the hydrogeologic framework, and perform an aquifer pumping test (test). The framework will be built from existing data such as Nebraska Department of Natural Resources (NeDNR) well logs, University of Nebraska Conservation and Survey Division test holes and reports, and new data from the aquifer pumping test. The deliverable will be a detailed report with including several hydrogeologic cross sections showing the major hydrostratigraphic layers, and maps showing the direction of groundwater flow, and approximate thickness and extent of the aquifer, and a map showing the theoretical drawdown based on analytical groundwater flow model. The results from the aquifer characterization and capacity evaluation will serve as a technical guide to local stakeholders as the Village makes decisions to support its long-term economic viability. The deliverable will also provide data on aquifer vulnerability to pollutant sources.



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

The test will involve pumping one of the three Village wells and recording the groundwater level measurements in this well, and the two other Village wells with pressure transducers and data loggers. Water level measurements will be collected before, during, and after pumping to evaluate the aquifer's response under these conditions. Manual water level measurements will also be collected periodically during the test. The test will be designed so that pumping during the pre-pumping and recovery phases does not occur or is minimized.

The duration of pumping phase of the test is estimated at 48 hours, at 175 gallons per minute, but could go longer depending upon an evaluation of the initial results. The conceptual hydrogeologic model, test results, and aquifer storage and well field capacity evaluation, will be evaluated by a Professional Geologist registered in the State of Nebraska.

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

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

A large amount of discharge water will be dumped down a waterway through a pasture during the aquifer pump test. The Village will ensure that the discharge water does not cause erosion or effect anyone downstream of the site. The discharge water will flow down a small tributary of Elk Creek, pass under Malcolm Road, and be discharged safely to Elk Creek.

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

There are no other economically viable alternatives to the aquifer pumping test. Physically pumping and field monitoring how the aquifer responds to the stress is the least expensive and most reliable method.

3. Document all sources and report all costs and benefit data using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies shall be fifty (50) years or with prior approval of the Director, up to one hundred (100) years [T261 CH 2 (005)].
  - Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01).

The cost of the assessment is \$42,000, a fee schedule provided by the Village's engineer, JEO Consulting Group, Inc. (JEO), and hydrogeological services sub-consultant. This includes \$9,200 in project management, agency coordination, and meetings; \$10,000 for the aquifer pumping test; and \$22,800 for the analytical model, conceptual hydrogeologic model, and summary report.

- Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe any intangible or secondary benefits separately. In a case where there is no generally

accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, such that the economic feasibility of the project can be approved by the Director and the Commission (005.02).

No tangible benefits will be realized.

- All benefit and cost data shall be presented in a table form to indicate the annual cash flow for the life of the proposal, not to exceed 100 years (005.03). N/A
- In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, the economic feasibility of such proposal shall be demonstrated by such method as the Director and the Commission deem appropriate (005.04).

There are no immediate tangible benefits to the Village because of this project. The Assessment will inform sustainable water management decisions that support a rural community's long-term economic viability.

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

A total local cash contribution of \$17,000 has been split between the two project partners. The Village approved \$8,500 in cash match, as shown in the letter of support included with this application. As a direct project partner, the Lower Platte South NRD is also providing \$8,500 in cash match, as displayed in its letter of support from the General Manager attached to this application. The Village is requesting the balance of project costs (\$25,000) from the Nebraska Water Sustainability Fund.

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

This project will not have any OM&R expenses.

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.  
N/A
7. Describe how the plan of development minimizes impacts on the natural environment.

This project will not have any effect on the natural environment. Discharge water will be routed safely, without causing damage, to a waterway leading to a small tributary of Elk Creek.

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

The Village is using its Village Engineer, JEO, to implement the project. JEO is partnering with WSP USA Inc., for professional geologist services. WSP USA, Inc.'s professional geologist is licensed in the State of Nebraska and will oversee the aquifer pumping test, development of the conceptual hydrogeologic model, and all deliverables. The Village is legally responsible for maintaining its water system and providing a plentiful supply of water to the community. The project partner, Lower Platte South NRD, is technically capable to support the project and review reports for quality assurance.

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

The assessment aligns with the at least two of the implementation focuses within the NDNR's Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process (NDNR 2015 Plan) as described below:

**Objective 1 – Maintain data, information, and analysis capabilities for water planning.** The Village is using data that is maintained by NeDNR to support this project, as well as collecting valuable data from an aquifer pump test, that will support goals of the Lower Platte South NRD and their responsibilities of protecting groundwater resources.

**Objective 5 – Provide coordination of federal agencies, state agencies, local NRDs, and other water interests for the development of water resources programs and projects.** The Village is coordinating with Lower Platte South NRD and NDEQ and utilizing a key funding program of NeDNR to support this project.

10. Are land rights necessary to complete your project?

YES  NO

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

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

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

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

The Village owns the three supply wells that will be pumped and monitored during the field data collection effort. The Village will ensure that the adjacent property owner is aware that discharge water will be flowing through their land.

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

The aquifer pumping test will not damage or destroy any property.

## Section C.

### NRC SCORING

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

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

#### **Notes:**

- The responses to one criterion will not be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.
- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted in parenthesis. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.
- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

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

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

The Village has concerns about the capability of the source aquifer to supply the long-term water needs of the community's 430 citizens as it develops in the future. This project is a proactive step for the Village and Lower Platte South NRD to assess any

future issues related to water supply. Citizens have expressed concerns that any new demands on the water system may overstress the supply aquifer and interfere with neighboring wells. In total, approximately 550 to 600 people live within the assessment area, which includes several rural and acreage residents. The outcome of the assessment will allow the Village Board to make educated decisions on the growth and economic prosperity of the community. The Village has completed a hydraulic model of the water distribution system to determine any structural needs but has not completed a long-term aquifer pumping test (i.e. for a 48-hour period) to evaluate how the aquifer responds to pumping and to evaluate the existing well field capacity any future well field expansion.

If the limits of the aquifer are not known, the possible long-range impacts include:

- interference with existing wells in the immediate area,
  - limits to residential and commercial growth,
  - the enormous cost of relocating the Village's supply wells to a more suitable aquifer.
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 Lower Platte South NRD has an Integrated Management Plan (IMP), jointly developed by the NRD and NeDNR in May 2014. There are several goals listed in the IMP that support the Village's intentions for this project as described below:

- Listen to and respect the opinions of all stakeholders in the District – by supporting this project, the NRD is achieving this IMP goal as it has listened to the Village.
- Base planning decisions on the best scientific data, information, and methodologies readily available – the entire focus of this assessment is to collect scientific data to support future planning and sustainable growth decisions.
- Promote the future economic growth and vitality of the District – this assessment will directly support future economic growth in a rural area with a limited property tax base.
- Preserve and enhance instream flows and other water-based natural ecosystems that provide benefits supporting the health and safety of our citizens and the quality of their lives – this assessment will supply information to support future management actions to preserve the integrity of the source water aquifer.
- Fairly and equitably allocate the water supplies in the District and protect the water supplies that are the basis of existing investments – this assessment is a step to protecting a water supply.

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 assessment is part of a more comprehensive effort that will help project partners proactively assess any future water supply issues. It will also help answer questions about the vulnerability of the aquifer to water supply and potential well interference issues. The Village has interest in sustainable growth, and therefore needs solid information to base decisions from. The project will provide valuable hydrogeologic information for the Lower Platte South NRD to utilize as part of their regular groundwater management responsibilities.

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.

A goal of the Village is to obtain information that supports intelligent and sustainable decisions regarding the longevity and protection of the Village's source water supply. The benefits of this project directly support this goal by answering questions that the Village Board and multiple citizens have had for years such as 'does the aquifer support a healthy and growing community?' Without the assessment the Village Board and Planning Commission do not have the information they need to make informed decisions about the extent of development the existing well field and source aquifer can support. The Village has the potential to add commercial business and residential growth, essential to support the tax base which supports Village services and Malcolm Public Schools, provided they have water capacity to support this growth.

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

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

The assessment is designed to be simple in nature, as it supports a small, rural community in Nebraska. The benefit serves the community, an area approximately two miles around the Village's WHP area, and the Lower Platte South NRD. The project will help determine the sustainable withdrawal of potable water from the aquifer.

6. Is cost-effective;

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

There is no project cost for O/M, land and water acquisition, or alternative options. The assessment is simple and straightforward and funding will be used to complete a conceptual hydrogeologic model, to perform an aquifer pumping test, create an analytical model. These actions will determine how increased pumping demands may potentially lower water levels within the Study Area, the potential effect on neighboring wells, and the capacity of the aquifer to support economic growth. The assessment will produce highly-graphic deliverables that allows anyone in the Village to clearly understand the characteristics and physical make-up of the aquifer. The assessment will also benefit the Lower Platte South NRD.

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.

This project does not directly address any interstate compact, decree, state contract, or agreement of federal law. The project will help the Village and Lower Platte South NRD understand the source aquifer and how to manage it in a sustainable and responsible manner. Currently a data gap exists, and this project will close that data gap.

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.

This assessment will help to better understand the storage capacity of the aquifer within the Study Area that includes Malcom, Nebraska, a community of approximately 430 people. It will ensure that decisions made by Village officials do not negatively affect existing water users. The assessment could result in decisions that increase the local property tax base.

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.

Mapping the aquifer will provide information on areas that are more vulnerable to pollutant sources that may be unknown at this time. This project is a result of the Village's update of the Wellhead Protection Plan. The Village has high iron and manganese, but this project's focus is on water quantity and threats to the system in the future because of a lack of water. The largest consumers of water in the Village are residential and institutional (Malcolm Public School). There are some industrial users. This project will lead to sound management decisions to prevent future issues.

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.

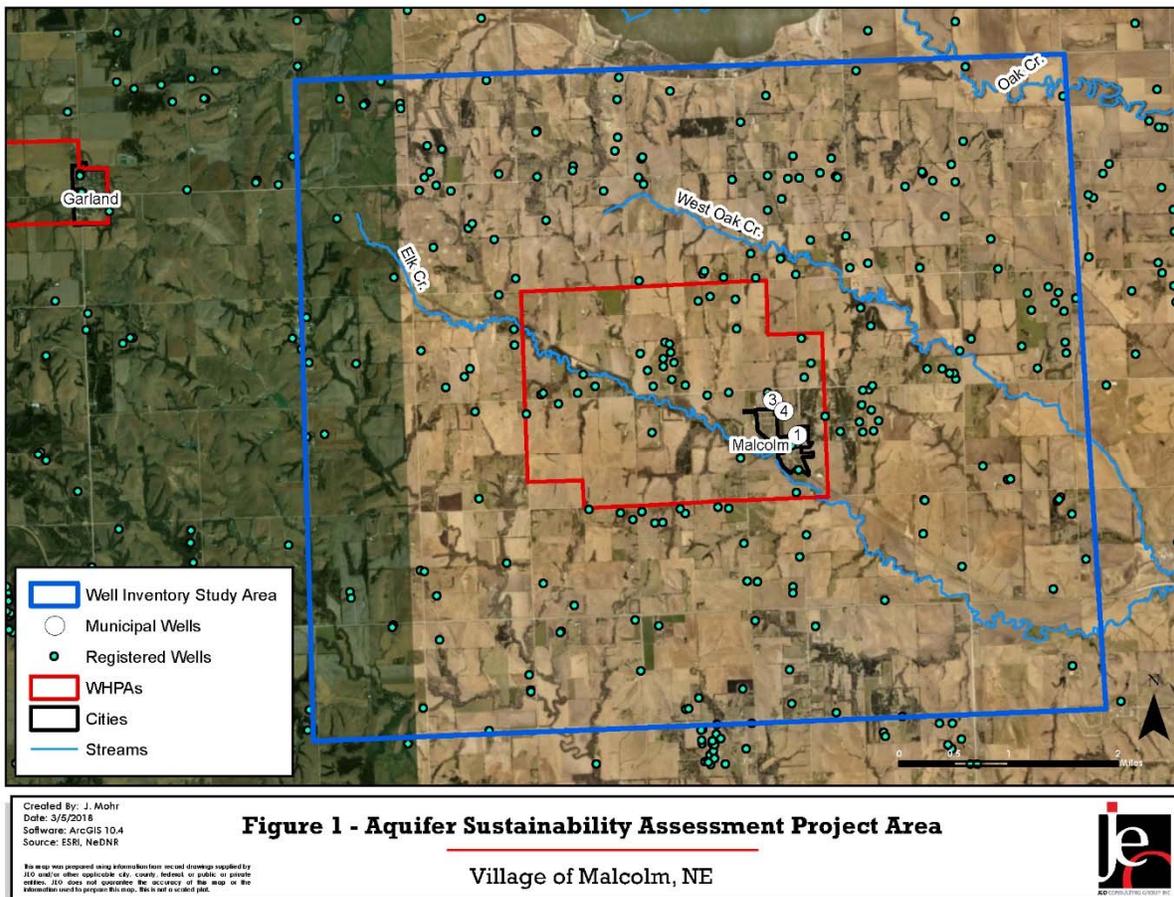
The Village of Malcolm will support the project with administrative support, field support, and \$8,500 in cash. They have a total taxable value of \$22,752,062, and a value attributable to growth of \$252,414. Other revenue sources available to the Village

including water/sewer bills, sales tax, property tax, and homestead tax. The Lower Platte South NRD is a financial partner and has matched the Village's \$8,500, totaling \$17,000 in cash contributions. The Village has a limited budget, due to a limited property tax base, and is not eligible for other notable community funding options, such as the Community Development Block Grant (CDBG) through the Department of Economic Development, or NDEQ's Source Water Protection Program. The Village does not meet the income eligibility requirements for these funding programs. This is unfortunate for small communities like Malcolm, as the demand for growth continues, but the available taxes are limited. The Village also has a relatively high-water bill because of a new wastewater treatment plan constructed in 2009. The Village Board is not able to raise utility rates to support special projects. The Village also spent \$10,000 in 2017 to study the capability of the distribution system.

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 Village recently updated the Comprehensive Development Plan that includes areas for future development, supported by results of a community survey about the future of the community, and recently worked with the Nebraska Rural Water Association and NDEQ to update its Wellhead Protection Plan. The Planning Commission served as the advisory group for both planning efforts. Based upon a robust public engagement process, slow steady growth is preferred, but many questions arose about the capability of the aquifer to support growth, along with concerns of potential well interference. All this work in 2017 and 2018 led to the idea of the Malcolm Aquifer Sustainability Assessment Project. The entire Village and it's many rural neighbors will benefit from the assessment, along with Lower Platte South NRD. Other stakeholders include NDEQ and the Nebraska Rural Water Association. The purpose of the project is to provide a scientifically based assessment that better characterizes the aquifer within the Study Area, so the Village Board can make decisions that support sustainable water use. The target area is shown in the figure below.



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.

Hundreds of small communities across the state are faced with water quantity and quality issues, but few have the resources needed to address the problems. With support of the Water Sustainability Fund, the Village can proactively assess any future issues through the completion of the Malcolm Aquifer Sustainability Assessment. This assessment will address concerns with available groundwater supply, specifically the storage capacity of the aquifer within the Study Area, and potential sustainability at the current and future demands of that supply. The Study Area is approximately 31,360 acres, or 7 square miles, with an estimated population of 550 to 600. The benefit to the state is assisting one of the many small communities with cost-sharing support to address water supply issues.

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

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

The state’s dollars are being leveraged with the Village and Lower Platte South NRD’s combined financial contributions. The breakdown of funding is shown in the table below:

FUNDING SUPPORT	FUNDING AMOUNT	COST-SHARE
Village/LPSNRD	\$17,000	40%
NRC WSF	\$25,000	60%
TOTAL	\$42,000	100%

14. Contributes to watershed health and function;

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

The project will provide detailed information on the presence, or absence, of saturated sands and gravels, locations of clay layers, and how closely Elk Creek and other waterways are connected, if at all, to the aquifer utilized by the Village. Although it is not expected, some local citizens have questioned if Branched Oak Reservoir (two miles straight north of the Wellhead Protection Area) is providing some recharge to the source aquifer. The assessment will help answer this question.

The assessment will also provide a general idea on the geologic sensitivity or how vulnerable the aquifer is to surface to pollutants in the watershed. The Village can use this assessment as a stepping stone to future watershed pollutant reduction practices, if warranted. Currently nitrate levels are very low, well within the Maximum Contamination Level for the Safe Drinking Water Act, but work may be necessary to ensure nitrates remain very low. It is important to understand the direct connection of the watershed to the groundwater below it, as the source of groundwater is mostly recharge from precipitation within the watershed, or nearby 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.

The assessment aligns with the at least two of the implementation focuses within the NDNR's Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process (NDNR 2015 Plan) as described below:

**Objective 1 – Maintain data, information, and analysis capabilities for water planning.** The Village of Malcolm is using data that is maintained by NeDNR to support this project, as well as collecting valuable data, from an aquifer pump test, that will support goals of the Lower Platte South NRD, and their responsibilities of protecting groundwater resources.

**Objective 5 – Provide coordination of federal agencies, state agencies, local NRDs, and other water interests for the development of water resources programs and projects.** The Village is coordinating with Lower Platte South NRD and NDEQ and utilizing a key funding program of NeDNR to support this project.

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

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

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

## Section D.

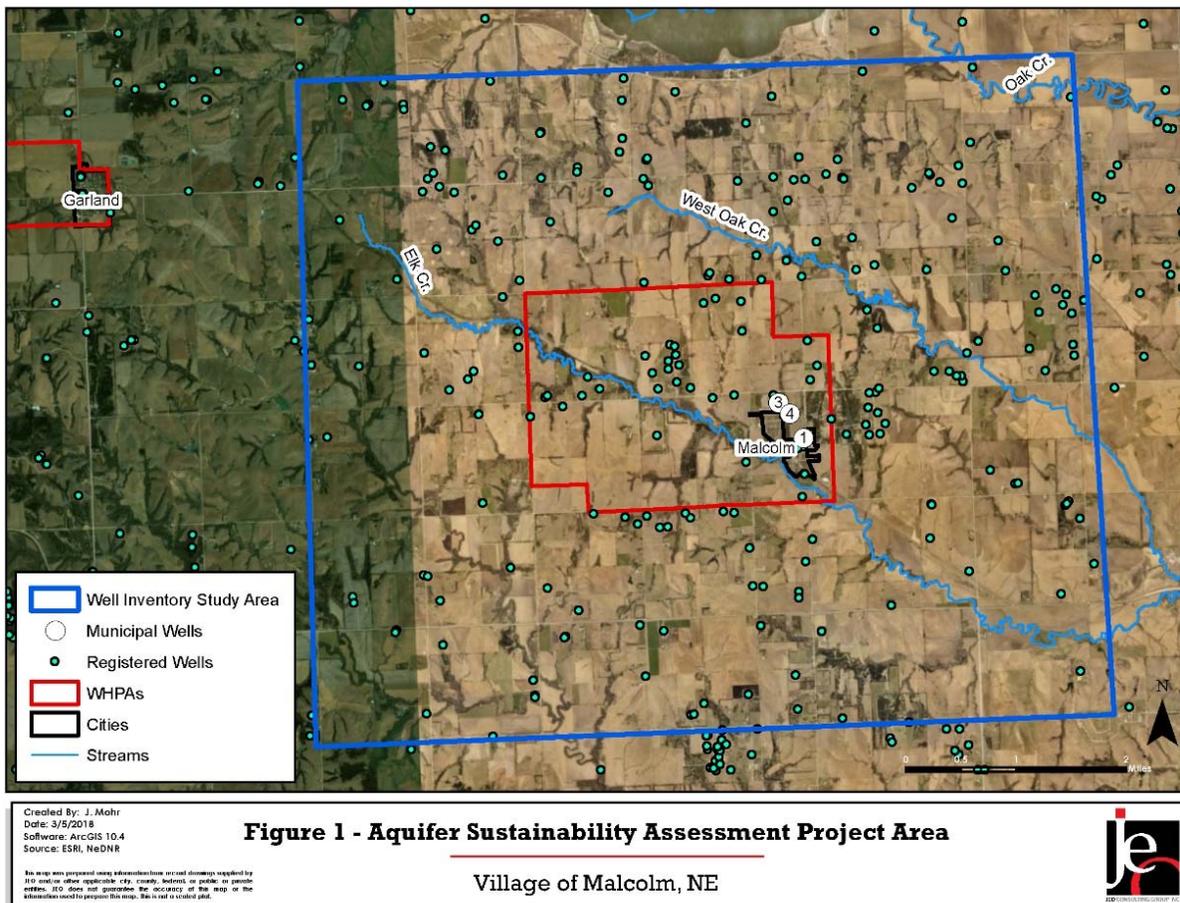
### PROJECT DESCRIPTION

#### 1. Overview

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

The Village of Malcolm (Village) is located 10 miles northwest of Lincoln, approximately two miles south of Branched Oak Reservoir. The Village is seeking assistance from the Nebraska Water Sustainability Fund to cost-share the Malcolm Aquifer Sustainability Assessment. The purpose of the assessment is to ensure the availability of groundwater in the future as the community grows. Groundwater quantity concerns began for the community when the Nebraska Rural Water Association and Nebraska Department of Environmental Quality (NDEQ) assisted in updating the Village's Wellhead Protection Area (WHPA) and Wellhead Protection Plan in 2017. During the update, the NDEQ expressed concern with the ability of the aquifer that supplies the Village's wells to support future growth in the community. As a part of the process, citizens came forward during a town meeting with concerns about the availability of groundwater, the potential for well interference on their private wells because of the increased pumping by the Village, and assurance that groundwater resources will be plentiful to support existing and future users. The project area is shown in the figure below. The projects objectives include:

- 1) Allow the community and Lower Platte South NRD to better understand of the physical characteristics of the aquifer of area two miles around the Village's existing WHP area (Study Area),
- 2) Estimate the storage capacity of the aquifer in the Study Area and yield of the existing well field to supply the surrounding area,
- 3) Identify potential targets areas for future exploration and well field expansion,
- 4) Complete a map showing the theoretical drawdown (i.e. water level decline) based on current and future pumping demand, and;
- 5) Qualitatively assess the vulnerability of the aquifer to potential surface contaminant sources.



The leadership and citizens of Village are interested in sustainable growth of the community which is the basis for efforts to evaluate the water system and water supply. Recently, the Village Board has completed the Malcolm Water System Issues Hydraulic Modeling Project which evaluated the water system to ensure that the pressure and capacity is adequate for current residents and future developments. The Aquifer Sustainability Assessment is part of a comprehensive effort to identify future water supply issues and discover vulnerabilities of the aquifer to water supply and potential well interference issues. Currently the Village has three fully functioning municipal wells, which have been determined by the Village Engineer to be suited for approximately 900 residents. Because the current population of Village is just over 400 residents, there are no plans or actions in the short-term to site or construct a new well.

The Aquifer Sustainability Assessment will further advance the Village of Malcolm's ability to plan for and realize their goal of sustainable growth for the community to support the tax base and allow the community to prosper.

The Study Area that has been selected for the Assessment is an area two miles around the WHPA. This area was chosen as it will show all the impacts of pumping on the local water table. The objectives of the Village of Malcom Aquifer Sustainability Assessment

will be achieved through the completion of four tasks within the Study Area, which include: Task 1 - Project Management and Meetings, 2) Well Inventory Conceptual Hydrogeologic Model, 3) Aquifer Pump Test, and 4) Data Evaluation and Report. The project management and meetings will allow of efficient communication about the project and scheduling of the pump test. Project management and meetings includes sharing information with the public.

The pump test will be conducted by pumping one of the existing municipal wells for a minimum of 48-hours, at approximately 175 gallons per minute, and monitoring the change in water levels in all three wells. The water level data will be collected during the 48-hours and for 24-hours prior to and 24-hours after the pump test. The third task, well inventory and conceptual hydrogeologic model will be an in-depth review of all well logs for the area and the creation of a visual representation of the aquifer and other hydrostratigraphic units. The tasks will then be summarized into a report that will detail the findings of the assessment and the condition of the aquifer.

## 2. Project Tasks and Timeline

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

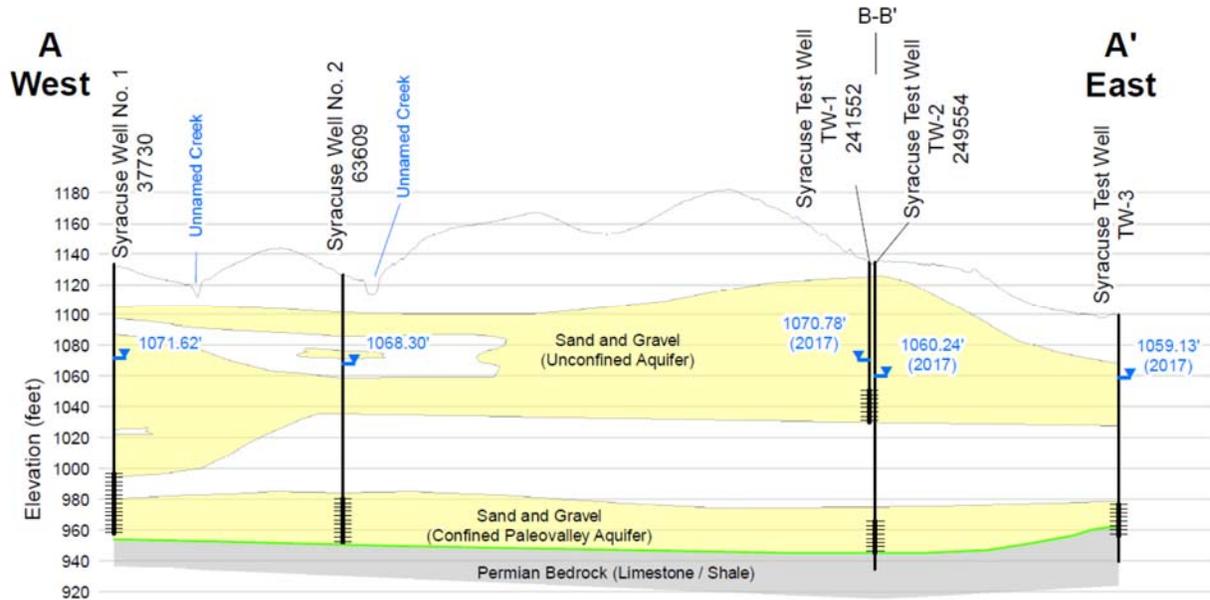
All project task will be completed within a one-year period from January 2019 to September 2019. Details on the project tasks described above are provided below:

### Task 1 – Project Management and Meetings

Project management will mainly include coordination between the Village, contractors, Lower Platte South NRD, and the property owner where the pumping well is located. This task includes invoicing, progress reports, project scheduling, and day-to-day communication. The contractor's project manager will attend Village Board meetings, an update meeting with Lower Platte South NRD, and distribution of project findings with property owners and citizens.

### Task 2 – Well Inventory and Conceptual Hydrogeologic Model

The well inventory and hydrogeologic conceptual model involves an in-depth review of all well logs in the area and creating a visual representation of the aquifer and other hydrostratigraphic units. At least four cross sections will be created showing the screening depths of all wells in the area, if available, and the extent and location of the aquifer. A project summary report will be established that discusses the methods used for the pump test, analysis of the pump test results, and discussion of the well field's capacity. The report will also include the hydrogeologic cross sections, summarize aquifer conditions, and provide a general summary for the Village Board regarding the potential for future issues should the demand within the Village increase. The report will be presented to the Village Board to communicate the results of the assessment. An example of a conceptual model cross section is provided below.



### Task 3 – Aquifer Pump Test

The aquifer pump test includes creation of a pre-pump project plan that details specific procedures, who will be responsible for installation and programming of the water level monitoring equipment (data loggers), collection of water level and flow rate data, and data analysis. The test will be conducted by pumping and monitoring water levels in an existing municipal well for a minimum of 48-hours, and monitoring water levels in the other two municipal wells. In addition to the pumping period, water level data will be collected for a 24-hours prior to and 24 hours after pumping stops. Water levels will be measured in all wells using data loggers. A meeting will be held pre-pump test with the Village Water Operator to discuss the logistics of the pump test.

### Task 4 – Data Evaluation and Reporting

Data evaluation and reporting includes development of a final report that details all aquifer data, cross sections, maps, and management recommendations. The report will also describe data gaps, concerns, and projection of what the aquifer can support. Maps will include aquifer storage estimate, well inventory with screening depths (if available), drawdown map and potential water level decline, aquifer vulnerability assessment, well siring targets, estimated sustainable yields, and others.

### 3. Partnerships

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

This is the first attempt to obtain funding to move this assessment forward. Below is a summary of partners:

- 1) Village of Malcolm – project sponsor and solely responsible for implementation of the project. Responsible for coordinating a pump test of one municipal well for 48-hours, providing access to wells, and reviewing the final report.
- 2) Lower Platte South NRD – financial partner through the Community Assistance Program, technical support, and responsible for quality assurance of the final deliverables.
- 3) Nebraska Department of Environmental Quality (NDEQ) – technical support and assisting with recent update of the wellhead protection area.

4. Other Sources of Funding

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

The states dollars are being leveraged with the Village and Lower Platte South NRD’s combined financial contributions. The Lower Platte South NRD confirmed it’s funding at the July 18, 2018 Board Meeting. The Village approved funding at its February 7, 2018 Board meeting. The Village and Lower Platte South NRD created a partnership as shown below in the table with the funding breakdown. If the Water Sustainability Fund application is not successful, the assessment will likely not proceed.

<b>FUNDING SUPPORT</b>	<b>FUNDING AMOUNT</b>	<b>COST-SHARE</b>
Village/LPSNRD	\$17,000	40%
NRC WSF	\$25,000	60%
<b>TOTAL</b>	<b>\$42,000</b>	<b>100%</b>

5. Support/Opposition

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

The concerned citizens, area property-owners, and Village Board support the assessment because it will help fill data gaps and answer questions about the physical capability of the aquifer to support the local drinking water supply. The NDEQ also supports the project as their geologist wants to learn more about how the groundwater recharges to the Wellhead Protection Area, and how the water levels will respond to the stress of an aquifer pumping test. The Lower Platte South NRD supports the project because they can assist a rural community with a water supply concern and the project will supply outstanding information on the area aquifers.