# WELLHEAD PROTECTION PLAN

**For**

## CITY OF LAFAYETTE

This plan is in effect from:
(Date to be inserted following formal Plan approval by MDH)

FINAL WHP Plan – Approved by City Council on February 13, 2012

## Forward

This document presents the wellhead protection (WHP) plan for the City of Lafayette that will help provide for an adequate and safe drinking water supply for community residents. It contains the following components:

- Assessment of the data elements used to prepare the plan;
- Delineation of the wellhead protection area;
- Delineation of the drinking water supply management area;
- Assessments of well and drinking water supply management area vulnerability;
- Impact of land and water use changes on the public water supply well(s) used by the water supplier;
- Issues, problems, and opportunities affecting the well(s), well water, and the drinking water supply management area;
- Wellhead protection goals for this plan;
- Objectives and plan of action for achieving the wellhead protection goals;
- Evaluation program for assessing the effectiveness of this plan; and
- Contingency strategy to address an interruption of the water supply.

**Water Supply Wells Included in This Plan**

| Unique Number | Well Name or Number | Use/Status[1] |
|---|---|---|
| **209735** | **Well #1** | **P** |
| **232489** | **Well #3** | **P** |

[1]P = Primary Water Supply Well, E = Emergency Backup Well, S = Seasonal Well

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# Table of Contents



**List of Figures**

## Table of Contents - Continued

**Page**

**List of Tables**



**List of Appendices**

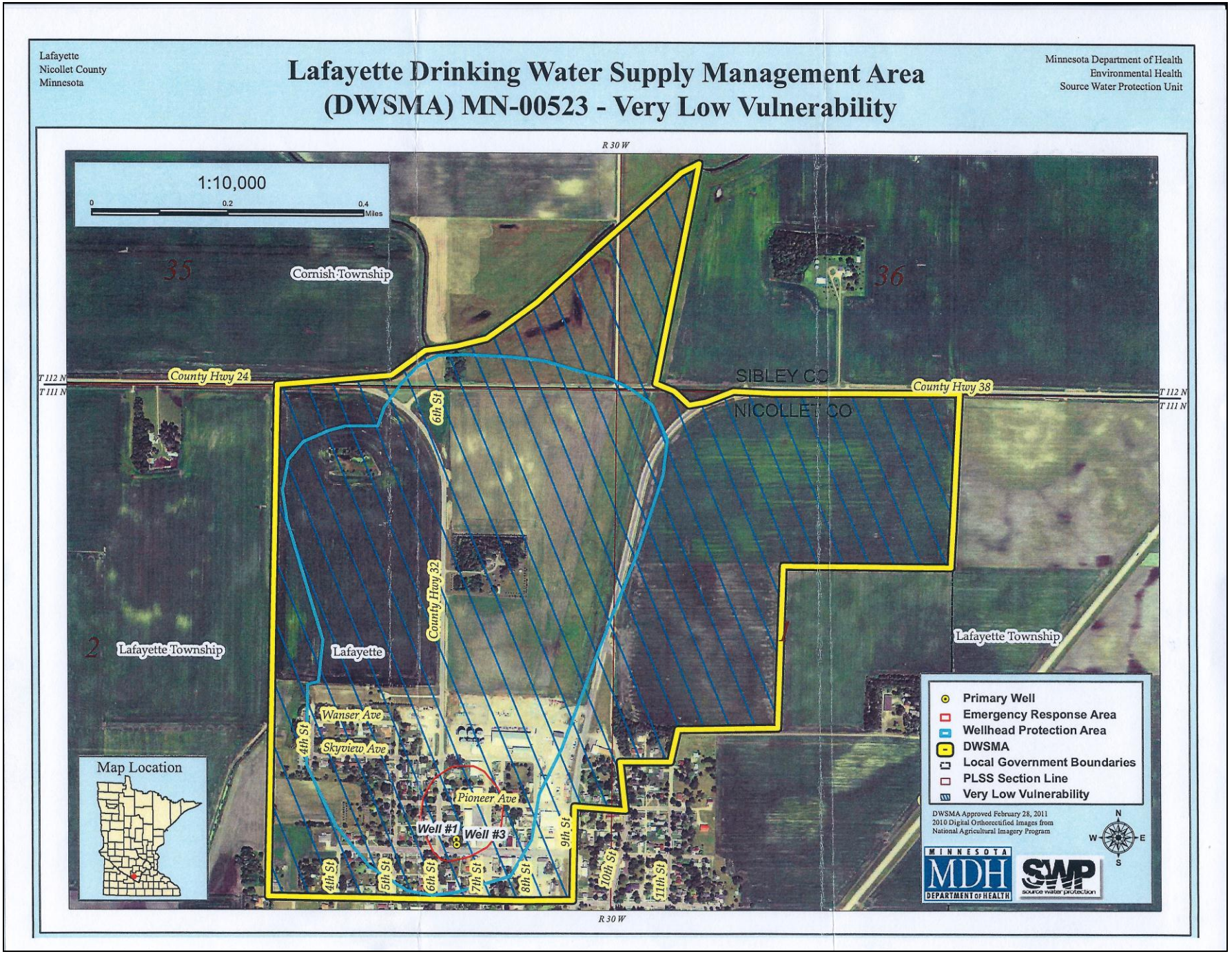


**FIGURE 1 – Drinking Water Supply Management Area**

# Chapter 1 - Introduction

## 1.1 Background

The wellhead protection (WHP) plan for the City of Lafayette was prepared in cooperation with the Minnesota Department of Health (MDH) and the Minnesota Rural Water Association (MRWA). It contains specific actions that the city will take to fulfill WHP requirements that are specified under Minnesota Rules, part 4720.5510 to 4720.5590. Also, the support that Minnesota state agencies, federal agencies, Nicollet & Sibley Counties, and others will provide is presented to identify their roles in protecting the city's drinking water supply. The plan is effective for 10 years after the approval date specified by MDH and the city is responsible for implementing its WHP plan of action, as described in Table 9 of this report. Furthermore, the city will evaluate the status of plan implementation at least every two-and-one-half years to identify whether its WHP plan is being implemented on schedule.

## 1.2 Plan Appendices

Much of the technical information that was used to prepare this plan is contained in the appendices but is summarized in the main body of this plan. In particular:

- Appendix I contains the first part of the plan, consisting of the delineation of the wellhead protection area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply well(s) and the DWSMA. This part of the plan is summarized in Chapter 3.
- Appendix II contains the inventory of potential contamination sources. This inventory is discussed in Chapter 4 in terms of assigning risk to the city's water supply and is also discussed in Chapter 6, relating to issues, problems or opportunities.
- Appendix III contains the contingency strategy to provide for an alternate water supply if there is a disruption caused by contamination or mechanical failure. This information is discussed in Chapter 11.
- Appendix IV contains Maps, Figures and other supporting documents utilized in the preparation of this WHP Plan.

# Chapter 2 - Identification and Assessment of the Data Elements Used to Prepare the Plan

The data elements that are included in this plan were used to 1) delineate the WHPA and the DWSMA and to assess DWSMA and well vulnerability and 2) document the need for the WHP measures that will be implemented to help protect the city's water supply from potential sources of contamination. The city met with representatives from MDH on two occasions to discuss data elements that are specified in Minnesota Rules, part 4720.5400, for preparing a WHP plan.

The first scoping meeting, held on August 25, 2010, addressed the data elements that were needed to support the delineation of the WHPA, the DWSMA, and the well(s) and DWSMA vulnerability assessments. The second scoping meeting, held on June 7, 2011, discussed the data elements required to 1) identify potential risks to the public water supply and 2) develop effective management strategies to protect the public water supply in relation to well and DWSMA vulnerability. The results of each meeting were communicated to the city by MDH through a formal scoping decision notice (See

Appendix IV). Not all of the data elements listed in the WHP rule had to be addressed in the WHP plan because of the nonvulnerable nature of the city's source of drinking water.

The following table presents the data element assessment results relative to the overall impact that each data element has on the four items listed.

Table 1 is the assessment of the present and future implications of the data elements on the four planning activities. The data elements that are shaded are not required or needed, as previously stated, because of the nonvulnerable setting. These data elements are included in the table for information purposes only. The data elements that are marked high (H) are considered to have a direct implication or impact on the activity. Data elements that have an indirect or marginal impact on an activity are shown as moderate (M). A data element that has little if any impact is shown as low (L). The data elements contained in the following table appear to contain sufficient information to address the four planning activities.

**Table 1 - Assessment Results for the Data Elements**

| Data Element | Present and Future Implications | | | | Data Source |
|---|---|---|---|---|---|
| | Use of the Well (s) | Delineation Criteria | Quality and Quantity of Well Water | Land and Groundwater Use in DWSMA | |
| **Precipitation** | | | | | |
| **Geology** | | | | | |
| Maps and geologic descriptions | M | H | H | H | Lusardi (2009) and Lusardi and Livley (2009) |
| Subsurface data | H | H | H | H | CWI, DNR |
| Borehole geophysics | M | H | H | H | CWI |
| Surface geophysics | L | L | L | L | None available |
| Maps and soil descriptions | | | | | |
| Eroding lands | | | | | |
| **Soils** | | | | | |
| Maps and soil descriptions | | | | | |
| Eroding lands | | | | | |
| **Water Resources** | | | | | |
| Watershed units | | | | | DNR, USGS |
| List of public waters | | | | | DNR |
| Shore land classifications | | | | | DNR |
| Wetlands map | | | | | LMIC |
| Floodplain map | | | | | FEMA |
| **Land Use** | | | | | |
| Parcel boundaries map | L | H | L | H | Nicollet County |
| Political boundaries map | L | H | L | L | City of Lafayette, Nicollet County |
| PLS map | L | H | L | L | MGEO |
| Land use map and inventory | | | | H | City of Lafayette |
| Comprehensive land use map | | | | H | City of Lafayette |
| Zoning map | | | | H | City of Lafayette |

| Data Element | Present and Future Implications | | | | Data Source |
|---|---|---|---|---|---|
| | Use of the Well (s) | Delineation Criteria | Quality and Quantity of Well Water | Land and Groundwater Use in DWSMA | |
| **Public Utility Services** | | | | | |
| Transportation routes and corridors | | | | H | City of Lafayette |
| Storm/sanitary sewers and PWS system map | | | | M | City of Lafayette |
| Oil and gas pipelines map | | | | | None in DWSMA |
| Public drainage systems map or list | | | L | | County Ditch JD 1 |
| Records of well construction, maintenance, and use | H | H | H | M | City of Lafayette, CWI, MDH files |
| **Surface Water Quantity** | | | | | |
| Stream flow data | | | | | |
| Ordinary high water mark data | | | | | |
| Permitted withdrawals | | | | | |
| Protected levels/flows | | | | | |
| Water use conflicts | | | | | |
| **Groundwater Quantity** | | | | | |
| Permitted withdrawals | H | H | H | H | DNR, SWUDS Database |
| Groundwater use conflicts | H | M | H | H | DNR – None in DWSMA |
| Water levels | H | H | H | H | DNR special studies (Unpublished data) RE: Water supply for Heartland Corn Products |
| **Surface Water Quality** | | | | | |
| Stream and lake water quality management classification | | | | | |
| Monitoring data summary | | | | | |
| **Groundwater Quality** | | | | | |
| Monitoring data | H | H | H | H | MDH compliance and investigative monitoring, city data |
| Isotopic data | H | H | H | H | MDH investigative sampling |
| Tracer studies | H | H | H | H | None available |
| Contamination site data | M | M | M | M | MPCA, MDA |
| Property audit data from contamination sites | | | | | Unavailable |
| MPCA and MDA spills/release reports | | | | H | MPCA |

# Chapter 3 - Delineation of the Wellhead Protection Area, Drinking Water Supply Management Area and Vulnerability Assessments

A detailed description of the process used for 1) delineating the WHPA and the DWSMA, and 2) preparing the vulnerability assessments of the city water supply well(s) and DWSMA is presented in Appendix I. The City of Lafayette requested that MDH do this work and Stephen W. Robertson, P.G., who is licensed as a geoscientist by the State of Minnesota, performed it.

## 3.1 WHPA and DWSMA Delineation

Figure 1 shows the boundaries of the WHPA and the DWSMA. The WHPA was delineated using computer simulations of groundwater movement to generate the underground capture zones for city Wells #1 (Unique No. 209735) and Well #3 (Unique No. 232489). The Wellhead Protection Area (WHPA) for these water supply wells is also shown in Figure 1. The maps showing the 200' radius Inner Wellhead Management Zones (IWMZ) for these wells are contained in Appendix IV.

The DWSMA boundaries were designated using the following criteria:

- Center-lines of highways, streets, roads, or railroad rights-of-ways;
- Public Land Survey coordinates;
- Property or fence lines;
- Centerlines of public drainage systems.

## 3.2 Well Vulnerability Assessment

Well construction and water quality data obtained from each primary well used by the City of Lafayette is included in the assessment of well vulnerability. It is unclear from the incomplete well logs for each of the city wells whether either of the wells meets current Well Code (MN Rules, Part 4275) construction specifications (see notes in Section 6.1.1, on Page 9 of Appendix I). However, the lack of any signs of contamination in the well water indicates that the wells do not provide a pathway for contaminants to enter the aquifer used by the public water supplier.

## 3.3 DWSMA Vulnerability Assessment

The very low vulnerability assigned to the DWSMA was determined using geologic, soils, and groundwater chemistry information, and indicates that the source water aquifer exhibits a very low geologic sensitivity throughout the DWSMA and is isolated from the direct vertical recharge of surface water.

# Chapter 4 - Establishing Priorities and Assigning Risk to Potential Contamination Sources

The types of potential contamination sources of concern that may exist within the DWSMA were derived from the information collected to satisfy the data element requirements (Chapter 2). The impact assigned to each data element as part of the assessment process (Table 1) was used to assess the types of potential contamination sources that may present a risk to the city's drinking water supply. The very low vulnerability assessment for the DWSMA indicates that, generally, only wells, other types of boreholes, excavations that may reach the aquifer and certain types of Environmental Protection Agency Class V Wells are likely to impact the city wells.

## 4.1 Contaminants of Concern

None of the human-caused contaminants regulated under the federal Safe Drinking Water Act have been detected at levels indicating that any well it serves to draw contaminants into the aquifer as a result of pumping.

## 4.2 Inventory Results and Risk Assessment

A description of the locations of potential contamination sources is presented in Appendix II. A summary of the results for the IWMZ is listed in Table 2, and Table 3 presents these results for the remainder of the DWSMA. The priority assigned to each type of potential contamination source addresses 1) the number inventoried, 2) its proximity to a city well, 3) the capability of local geologic conditions to absorb a contaminant, 4) the effectiveness of existing regulatory controls, 5) the time required for the City of Lafayette to obtain cooperation from governmental agencies that regulate it, and 6) the administrative, legal, technical, and financial resources needed. A **high (H)** risk potential implies that the potential source type has the greatest likelihood to negatively impact the city's water supply and should receive highest priority for management. A **low (L)** risk potential implies that a lower priority for implementing management measures is assigned.

**Table 2 - Potential Contamination Sources and Assigned Risk for the IWMZ**

| Source Type | Total | Level of Risk |
|---|---|---|
| Sealed Well | 1 | L |
| Pump House Floor Drain (PIT) | 1 | L |

Table 3 - Potential Contamination Sources and Assigned Risk for the Rest of the DWSMA

| Potential Source Type | Total Number | Number Within Emergency Response Area and Level of Risk | | Number Within Remainder of the DWSMA and Level of Risk | |
|---|---|---|---|---|---|
| Domestic Well >100 feet deep | 2 | 0 | - | 2 | H |
| Sealed Well | 10 | 2 | L | 8 | L |
| Unused/Unsealed Well | 3 | 0 | - | 3 | H |
| Ag Spill or Petroleum Release Site | 5 | 0 | - | 5 | M |
| Ag Feed/Seed/Chemical Storage | 1 | 0 | - | 1 | H |
| Regulated Drainage Ditch | 1 | 0 | - | 1 | M |

# Chapter 5 - Impact of Land and Water Use Changes on the Public Water Supply Wells

The city estimates that the following changes to the physical environment; land use, surface water, and groundwater-may occur over the 10-year period that the WHP plan is in effect. This information is needed to determine whether new potential sources of contamination may be introduced in the future and to identify future actions for addressing these anticipated sources. Land and water use changes may introduce new contamination sources or result in changes to groundwater use and quality. The anticipated changes may occur within the jurisdictional authority of the city, although some may not. Table 4 describes the anticipated changes to the physical environment, land use, and surface water or groundwater in relationship to the 1) influence that existing governmental land and water programs and regulations may have on the anticipated change, and 2) administrative, technical, and financial considerations of the City of Lafayette and property owners within the DWSMA.

**Table 4 - Expected Land and Water Use Changes**

| **Expected Change** (Physical Environment, Land Use, Surface Water, Ground Water) | **Impact of the Expected Change On the Source Water Aquifer** | **Influence of Existing Government Programs and Regulations on the Expected Change** | **Administrative, Technical, and Financial, Considerations due to the Expected Change** |
|---|---|---|---|
| **Physical Environment** No change is anticipated. | Does not apply | Does not apply | Does not apply |
| **Land Use** | | | |
| 1) The city expects a limited amount of residential growth within the DWSMA | Increased withdrawal of groundwater water from the aquifer | Local zoning ordinances and land-use permits, well construction permits and DNR water appropriation permits | The Planning Commission and City Council will need to pay particular attention to protecting the groundwater thru diligent application of the subdivision ordinance.<br>The Comprehensive Plan and zoning ordinances need to be updates. |
| 2) Potential commercial development on the United Farmers Co-op property | Commercial development of the property could result in an additional need for process and crop production water | Local zoning ordinances and land-use permits, well construction permits and DNR water appropriation permits | The City's Comprehensive Plan and current zoning map indicate this property to be ZONE I1. Future land-use decisions must take into consideration the protection of the ground water resources |
| **Surface Water** No change is anticipated. | Does not apply | Does not apply | Does not apply |
| **Ground Water** Additional ground water use from a new high-capacity well within the DWSMA could result in increased pumping of the source water aquifer | Whether the City supplies the additional water or it is provided by other wells, additional groundwater use within the DWSMA presents concerns over water availability and potential contaminant loading to the City's water supply aquifer | The City will have to rely on the MDH well approval process and the DNR Water Appropriation Permit process to assure high capacity wells would not have a negative impact on the City water supply | An adequate water supply is vital to public health, safety and the economy of the City. Therefore, the City would need to determine technically and financially if City water could be supplied to a new, high-water-use customer |

# Chapter 6 - Issues, Problems, and Opportunities

## 6.1 Identification of Issues, Problems and Opportunities

The City of Lafayette has identified water and land use issues and problems and opportunities related to 1) the aquifer used by the city water supply wells, 2) the quality of the well water, or 3) land or water use within the DWSMA. The city assessed 1) input from public meetings and written comments it received, 2) the data elements identified by MDH during the scoping meetings, and 3) the status and adequacy of the city's official controls and plans on land and water uses, in addition to those of local, state, and federal government programs. The results of this effort are presented in the following table, which defines the nature and magnitude of contaminant source management issues in the city's DWSMA. Identifying issues, problems and opportunities, including resource needs, enables the city to 1) take advantage of opportunities that may be available to make effective use of existing resources, 2) set meaningful priorities for source management and 3) solicit support for implementing specific source management strategies.

## 6.2 Comments Received

There have been several occasions for local governments, state agencies, and the general public to identify issues and comment on the city's WHP plan. At the beginning of the planning process, local units of government were notified that the city was going to develop its WHP plan and were given the opportunity to identify issues and comment. A public information meeting was held on April 11, 2011, to review the results of the delineation of the wellhead protection area, DWSMA, and the vulnerability assessments. The meetings of the city's wellhead protection team were open to the public. Also, a public hearing was held before the completed WHP plan was sent to MDH for state agency review and approval. No comments were received.

**Table 5 - Issues, Problems, and Opportunities**

| Issue Identified | Impacted Feature | Problem Associated with the Identified Issue | Opportunity Associated with the Identified Issue | Adequacy of Existing Controls to Address the Issue |
|---|---|---|---|---|
| There are private wells on residential properties within the DWSMA. | Aquifer Well Water Quality DWSMA | The city needs to assess which wells present a threat to the aquifer based upon their depth, construction, and state of use and/or repair. | The City can furnish property owners with private well management information.<br><br>The City can partner with the MDH SWP Grant and Loan Program and Nicollet county to help property owners pay for the costs of properly sealing unused wells | The city does not have authority to require that unused wells be properly sealed.<br><br>The City should review, and consider adopting, proposed private well management ordinance language being developed by LMC.<br><br>The Minnesota Department of Health has authority to require well sealing. |

| | | | | |
|---|---|---|---|---|
| The City recognizes this is a 10-year plan and that issues, problems, and opportunities can change, from current status, which can impact the implementation strategies. | Public Health, Aquifer, DWSMA and Well Water Quality | The City must have the flexibility to address changing situations. | The City has the opportunity to address those issues, problems and opportunities that may change over the next 10 years. | The City, local and state governments have existing controls in place to address most issues as they occur. The City, local and state governments are continually updating land use controls as new issues, new problems and new opportunities occur. |
| Communication with land owners and resource partners. | Public Health, Well Water Quality | City Council has not allocated funds for communication purposes. | Apply for a grant to develop the City's web site and mail brochures to citizens. | MDH SWP Grant & Loan Program |

# Chapter 7 - Existing Authority and Support Provided by Local, State, and Federal Governments

In addition to its own controls, the City of Lafayette will rely upon partnerships formed with local units of government, state agencies, and federal agencies with regulatory controls or resource management programs in place to help implement its WHP plan. The level of support that a local, state, and federal agency can provide depends on its legal authority, as well as the resources available to local governments.

## 7.1 Existing Controls and Programs of the City of Lafayette

Table 6 shows the legal controls and/or programs that the city has identified to support the management of potential contamination sources within the DWSMA.

**Table 6 - Controls and Programs of the City of Lafayette**

| Government Unit | Type of Program | Program Description |
|---|---|---|
| City Council | 1) Long-Range Comprehensive Land Use Plan | 1) Establishes Citywide goals and priorities towards current and future community development. |
| City Council | 1) Land Use Permits<br><br>2) Conditional Use Permits | 1) Regulates land-uses to comply with zoning ordinance.<br><br>2) Specifies performance standards needed to offset environmental risk presented by a specific land use. |
| Public Works & City Council | 1) Construction, repair and maintenance of City roads & streets<br><br>2) Construction, repair, and | 1) Specifies the design, construction, and maintenance of City roads & streets, and storm water related to them.<br><br>2) Governs the design, construction and maintenance of City water and sewer utilities. |

| | | |
|---|---|---|
| | maintenance of City water and sewer utilities<br><br>3) Water use and deficiencies | 3) Manages water use through a local Water Ordinance, fee schedules and water-use bans during drought conditions or heavy water consumption. |

## 7.2 Local Government Controls and Programs

The following departments or programs within Nicollet and Sibley County may be able to assist the city with issues relating to potential contamination sources that 1) have been inventoried or 2) may result from changes in land and water use within the DWSMA:

**Table 7 - Local Agency Controls and Programs**

| Government Unit | Type of Program | Program Description |
|---|---|---|
| Nicollet and Sibley County Zoning Department | 1) Household Hazardous Waste Collection.<br><br>2) Land Use Permits<br><br>3) Conditional Use Permits<br><br>4) On-site Waste Water Treatment<br><br>5) Animal Feedlots | 1) Provides education to landowners and an on-going program for disposing of household hazardous waste, in conjunction with Chisago County.<br><br>2) Regulates land-uses to comply with zoning ordinances.<br><br>3) Specifies performance standards needed to offset environmental risk presented by a specific land use.<br><br>4) Approves the design, installation, operation, and performance of on-site wastewater treatment systems. |
| Nicollet and Sibley County Emergency Management | 1) Transportation accidents causing contaminant spills<br><br>2) Natural disasters | 1) Directs the response and the extent of initial clean up of fuel, chemical, or other hazardous substances that are released due to transportation accidents.<br><br>2) Coordinate the development of effective emergency management operations plans through education, training, and exercising. (Sheriff)<br>http://www.co.nicollet.mn.us/index.asp |
| Nicollet and Sibley County Soil and Water Conservation District | 1) Agricultural BMPs<br>2) Storm Water Management<br>3) Wetland Management<br>4) Feedlots<br>5) Residential BMPs<br>6) Well Sealing Cost Share | The Nicollet & Sibley County SWCDs promote the protection of water and soil resources in the County through educational programs, cost sharing and collaboration with other local, state and federal agencies.<br>http://www.nicolletswcd.org/ |

## 7.3 State Agency and Federal Agency Support

MDH will serve as the contact for enlisting the support of other state agencies on a case-by-case basis regarding technical or regulatory support that may be applied to the management of potential contamination sources. Participation by other state agencies and the federal government is based on legal authority granted to them and resource availability. Furthermore, MDH 1) administers state regulations that affect specific potential sources of contamination and 2) can provide technical assistance to property owners to comply with these regulations.
The following table identifies the specific regulatory programs or technical assistance that state and federal agencies may provide to the City of Lafayette to support implementation of the WHP plan. It is likely that other opportunities for assistance may be available over the 10-year period that the plan is in effect due to changes in legal authority or increases in funding granted to state and federal agencies. Therefore, the table references opportunities available when the city's WHP plan was first approved by MDH.

**Table 8 - State and Federal Agency Controls and Programs**

| Government Unit | Type of Program | Program Description |
|---|---|---|
| MDH | State Well Code (Minnesota Rules, Chapter 4725) | MDH has authority over the construction of new wells and the sealing of wells. MDH staff in the Well Management Program offer technical assistance for enforcing well construction codes, maintaining setback distances for certain contamination sources, and well sealing. |
| MDH | WHP | MDH has staff that will help the city identify technical or financial support that other governmental agencies can provide to assist with managing potential contamination sources. |
| DNR | Water appropriation permitting (Minnesota Rules, Chapter 6115) | DNR can require that anyone requesting an increase in existing permitted appropriations, or to pump groundwater, must address concerns regarding the impacts to drinking water if these concerns are included in a WHP plan. |
| US EPA | Class V Wells | Class V Wells are not allowed within the DWSMA per federal rules and regulations. The US EPA office in Chicago (Region V) has primary authority over Class V Wells within the State of Minnesota. |

## 7.4 Support Provided by Nonprofit Organizations

The Minnesota Rural Water Association (MRWA) has provided technical assistance to the City of Lafayette throughout the development of the current WHP Plan and will assist the City with amendments to the WHP Plan and implementing its WHP Plan by providing: 1) referenced educational and outreach materials for land owners, 2) technical assistance for implementing individual WHP action items listed in this Plan, and 3) support to the City for assessing the results of Plan implementation.

# Chapter 8 - Goals

Goals define the overall purpose for the WHP plan, as well as the end points for implementing objectives and their corresponding actions. The WHP team identified the following goals after considering the impacts that 1) changing land and water uses have presented to drinking water quality over time and 2) future changes that need to be addressed to protect the community's drinking water:

- Maintain a safe and adequate drinking water supply for community residents;
- Prevent contaminants from reaching levels that present a risk to people's health.
- Provide the citizens with educational materials and other resources to assist landowners with drinking water protection issues:
    - Private well use, and maintenance
    - Financial assistance for sealing of unused/unsealed wells
    - Transportation corridor emergency preparedness plan
    - Continuing data collection

# Chapter 9 - Objectives and Plan of Action

Objectives provide the focus for ensuring that the goals of the WHP plan are met and that priority is given to specific actions that support multiple outcomes of plan implementation.

Both the objectives and the wellhead protection measures (actions) that support them are based on assessing 1) the data elements (Chapter 2); 2) the potential contaminant source inventory (Chapter 4); 3) the impacts that changes in land and water use present (Chapter 5) and; 4) issues, problems, and opportunities referenced to administrative, financial, and technical considerations (Chapter 6).

## 9.1 Objectives

The following objectives have been identified to support the goals of the WHP plan for the City of Lafayette:

1. Create public awareness and general knowledge about the importance of WHP for maintaining an adequate and safe drinking water supply;
2. Collect additional data to substantiate information contained within this Plan, and to provide more detail for future Plan amendments.
3. Provide landowners with best management practices and other information to assist with management of private property located within the DWSMA.
4. Provide direction to city and local planning bodies regarding future land use and development of property within the DWSMA.
5. Provide emergency response coordination for any impact to, or endangerment of, the City's water supply system.

## 9.2 WHP Measures and Action Plan

Based upon all of the above-referenced factors, the WHP team has identified WHP measures that will be implemented by the city over the 10-year period that its WHP plan is in effect. The objective that each measure supports is noted as well as 1) the lead party and any cooperators, 2) the anticipated cost for implementing the measure and 3) the year or years in which it will be implemented.

The following categories are used to further clarify the focus that each WHP measure provides, in addition to helping organize the measures listed in the action plan:

1. Monitoring, Data Collection and Assessment
2. Well & Contaminant Source Management
3. Land Use Planning
4. Education and Outreach
5. WHP Coordination, Reporting and Evaluation
6. Water Use and Contingency Strategy

## 9.3 Establishing Priorities

WHP measures reflect the administrative, financial, and technical requirements needed to address the risk to water quality or quantity presented by each type of potential contamination source. Not all of these measures can be implemented at the same time, so the WHP team assigned a priority to each. A number of factors must be considered when WHP action items are selected and prioritized (part 4720.5250, subpart 3):

- Contamination of the public water supply wells by substances that exceed federal drinking water standards.
- Quantifiable levels of contamination resulting from human activity.
- The location of potential contaminant sources relative to the wells.
- The number of each potential contaminant source identified and the nature of the potential contaminant associated with each source.
- The capability of the geologic material to absorb a contaminant.
- The effectiveness of existing controls.
- The time needed to acquire cooperation from other agencies and cooperators.
- The resources needed, i.e., staff, money, time, legal, and technical resources.

The City of Lafayette defines the priority approach for implementing a WHP measure as starting with those potential contaminant sources that pose the most significant risk to the water supply. The following table lists each measure that it will implement over the ten year period the city's WHP plan is in effect as well as the priority that it has assigned to each measure.

## Table 9 - WHP Plan of Action

| Monitoring, Data Collection and Assessment | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | Priority | Description | Objective Addressed | City Action Alone Unless Cooperator is Noted | Cost | Implementation time frame | | | | | | | | | | | | | |
| | | | | | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | | | | |
| 1 | H | Verify the locations of wells that are constructed within a one-mile radius of the DWSMA. Send a letter to listed cooperators requesting to be notified of well construction activities in the DWSMA, including irrigation and high capacity wells. | 2 | MDH, DNR, Well Drillers | | * | * | * | * | * | * | * | * | * | * | | | | |
| 2 | H | Update the well inventory (spreadsheet and map) every 2 ½ years. Review status of existing wells and add new wells identified within the DWSMA. | 2 | MDH, Well Drillers | | * | | | * | | | * | | * | | | | | |
| 3 | H | Work with MDH Hydro Geologist to collect geochemical data to determine whether the quality of the well water is changing over time due to pumping or deterioration of the well. | 2 | MDH | | | * | | | | | | | * | | | | | |
| 4 | H | If feasible, pull the pump from Well #1 and televise the casing for leaks. Work with MGS to gamma log the well bore hole (2011). Use information gained from the down-hole work to improve on the delineation approach for future amendments of the WHP Plan (2016-2018). Pursue MDH SWP Grant funds to assist with this effort. | 2 | MDH, MGS | $10,000 | | | | | | * | * | | | | | | | |
| 5 | H | Install automated monitoring equipment in both city wells in order to better monitor static and pumping water levels. Pursue MDH SWP Grant funds to assist with this effort. | 2 | MDH | $10,000 | | | * | | | | | | | | | | | |
| 6 | H | Install independent water meters at the city wells in order to gain better accuracy of individual well usage. Pursue MDH SWP Grant funds to assist with this effort. | 2 | MDH | $5000 | | | | | * | | | | | | | | | |
| 7 | H | Prioritize unused wells for sealing based upon their construction, condition, distance, depth and threat to the aquifer and public water supply wells. Pursue MDH SWP Grant funds to assist with sealing priority wells. | 2,3 | MDH | | | | | | * | | | | | | | | | |

## Well & Contaminant source Management

| Measure | Priority | Description | Objective Addressed | City Action Alone Unless Cooperator is Noted | Cost | Implementation time frame | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| 8 | H | Review & update the IWMZ survey form for all wells in the system every three years. | 2 | MDH MRWA | | | | | * | | | * | | | * |
| 9 | H | Monitor setbacks for all new potential contaminant sources within the DWSMA. | 2 | MDH | | * | * | * | * | * | * | * | * | * | * |
| 10 | H | Monitor any NON-CONFORMING potential contaminant sources identified within the DWSMA. | 2 | MDH | | | | * | | | * | | | * | |
| 11 | H | Work to abate or otherwise minimize the impact of any NON-COMPLYING potential contaminant sources currently documented in the DWSMA. | 2 | MDH | | | | * | | | * | | | * | |
| 12 | H | Work with MDH Hydro Geologist to determine whether potential spills or leaks may present risk to the community wells and drinking water quality. | 2 | MDH | | | * | | | | | | | | |
| 13 | H | Provide a map of the DWSMA to the local fire department, and County & State Highway Departments pointing out the specific location of the City wells. Request their awareness and prompt response to accidents, spills. Leaks and clean-up efforts near the City Wells. | 4,5 | FD, County Highway, MNDOT | | | * | | | | | | | | |
| 14 | L | Provide information to MDH to clarify the Old Municipal Well Inventory. Specifically eliminate the confusion between the old Farmers Coop Creamery well and City Well #2. Provide sealing record to MDH. | 4 | | | * | | | | | | | | | |
| 15 | H | Provide information on proper management and sealing of private wells to landowners in the DWSMA. | 1,3 | MDH, MRWA | | | * | | | | | * | | | |
| 16 | H | Research the availability of funds from the County SWCD for well sealing cost share and provide this information to landowners in the DWSMA. | 3 | MDH, SWCD | | | * | | | | | | | | |
| 17 | H | Apply for a MDH SWP Grant to seal high priority unused unsealed wells identified in the DWSMA. | 3 | MDH | | | * | | | | | | | | |
| 18 | | Identify any new high-capacity wells that are proposed for construction in, or within one mile of, the DWSMA. | 2 | MDH, DNR | | * | * | * | * | * | * | * | * | * | * |
| 19 | H | If a new high-capacity well is identified, contact MDH Hydro Geologist to evaluate the effect the proposed well may have on the boundaries of the delineated WHPA and/or DWSMA. | 2 | MDH, DNR | | * | * | * | * | * | * | * | * | * | * |

| Land Use Planning | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | Priority | Description | Objective Addressed | City Action Alone Unless Cooperator is Noted | Cost | Implementation time frame | | | | | | | | | | | | |
| | | | | | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | | | |
| 20 | H | Review and update the Emergency/Contingency Strategy Plan portion of the City's WHP Plan to ensure that it contains current personnel information and any changes in the water supply system. | 5 | | | | | | | * | | | | | | | | |
| 21 | H | Request the County Water Plan Coordinator includes the DWSMA map and identifies local WHP issues and activities when the County Water Plan is updated. | 4 | County | | * | * | * | * | * | * | * | * | * | * | | | |
| 22 | H | Update current City Comprehensive Plan, Zoning Ordinances and Subdivision Ordinance to include references to the DWSMA and water quality concerns. | 4 | | | | | | * | | | | | | | | | |
| 23 | H | Work with local planning staff(s) to update comprehensive plans to reflect existing WHP issues and identify changes in local controls that can be made to protect the community water supply wells and aquifer. | 4 | County, Townships | | | | | * | | | | | | | | | |
| 24 | H | Work with MDH, League of Minnesota Cities and city planning staff to develop an ordinance that specifies the circumstances which control the placement of private wells within the City's jurisdiction. | 4 | MDH, League of MN Cities | | | | | * | | | | | | | | | |

## Education and Outreach

| Measure | Priority | Description | Objective Addressed | City Action Alone Unless Cooperator is Noted | Cost | Implementation time frame | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| 25 | H | Apply for a MDH SWP Grant to develop a City web site to provide a method of communication with land owners and resource partners. | 1.3 | MDH SWP Grant Program | $2500 | | * | | | | | | | | |
| 26 | M | Prepare an annual summary of wellhead protection activities for release to the public in the City newsletter, on the City website and post in public locations. | 1,3 | | | * | * | * | * | * | * | * | * | * | * |
| 27 | M | Provide an annual tour of the city water treatment facility to educate students about the source of drinking water, what WHP is, and steps they can take to help protect the wells and aquifer.. | 1 | | | * | * | * | * | * | * | * | * | * | * |
| 28 | M | Prepare and distribute a handout, describing WHP activities and the status of Plan implementation, at community events. | 1,3 | | $150 | * | * | * | * | * | * | * | * | * | * |
| 29 | H | Inform land owners of any financial resources available to help defray the cost of properly sealing unused/unsealed private wells. | 3 | SWCD, MDA, MDH | | | * | | | | | * | | | |

## Reporting & Evaluation

| Measure | Priority | Description | Objective Addressed | City Action Alone Unless Cooperator is Noted | Cost | Implementation time frame | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| 30 | M | Complete an Evaluation Report every 2.5 years that evaluates the progress of plan of action and the impact of any contaminant release on the aquifer supplying the water supply wells. | 4 | | | | | * | | | * | | * | | |
| 31 | M | Summarize all WHP Plan implementation efforts in a report to MDH in the 8th year. | 4 | | | | | | | | | | * | | |
| 32 | M | Hold an annual meeting with the WHP Team, local resource partners, and City Management, to discuss WHP Plan implementation activities, budget needs and pursue MDH SWP Grant funds to help with implementation efforts. | 1,3, 4,5 | | | * | * | * | * | * | * | * | * | * | * |
| 33 | H | Maintain a WHP FOLDER that contains records and documentation of all WHP activities the City has completed. | 4 | | | * | * | * | * | * | * | * | * | * | * |

| Water Use and Contingency Planning | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | Priority | Description | Objective Addressed | City Action Alone Unless Cooperator is Noted | Cost | Implementation time frame | | | | | | | | | | |
| | | | | | | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| 34 | H | Incorporate DWSMA vulnerability into the City's Emergency Response Plan. The City will consider the DWSMA vulnerability when responding to fires or contaminant spills; specifically the impacts that firefighting or cleanup procedures may have on contaminant movement to city wells or the aquifer. | 5 | Fire Department | | * | | | | | * | | | | |
| 35 | H | Develop and distribute the City's WHP Contingency Strategy Plan. Review every 5 years and update if necessary. Coordinate emergency response initiatives with Nicollet County. | 5 | County, MNDOT, SWCD | | * | | | | | * | | | | |

### 9.4 Commitments From Cooperators

The agencies listed in Table 10 have been asked to support the City of Lafayette with implementing the WHP measure(s) in which they are identified.

**Table 10 - Cooperators**

| Agency | Measure Identified |
|---|---|
| MDH | 1,2,3,4,5,6,7,8,9,10,11,12,15,16,17,18,19,24,25,29 |
| MDA | 29 |
| DNR | 1,18,19 |
| MGS | 4 |
| MRWA | 7,15,25 |
| Well Drillers | 1,2 |
| Fire Department | 13,34 |
| County Highway Department | 13,35 |
| MN DOT | 13,35 |
| SWCD | 16,29,35 |
| County | 21,23,35 |
| Township | 23 |
| League of Minnesota Cities | 24 |

# Chapter 10 - Evaluation Program

Evaluation is used to support plan implementation and is required under Minnesota Rules, part 4720.5270, prior to amending the city's WHP plan. Plan evaluation is specified under Objective 6 and provides the mechanism for determining whether WHP action items are achieving the intended result or whether they need to be modified to address changing administrative, technical, or financial resource conditions within the DWSMA. The city has identified the following procedures that it will use to evaluate the success with implementing its WHP plan:

1. An annual briefing to the city council will provide the basis for documenting whether each action step for that year was implemented.
2. The WHP team will meet, at a minimum, every two-and-one-half years to assess the status of plan implementation and to identify issues that impact the implementation of action steps throughout the DWSMA;
3. On a 2.5-year schedule, the city will assess the results of each action item that has been taken to determine whether the action item has accomplished its purpose or whether modification is needed. Assessment results will be presented in the annual briefings to the city council.

4. The city will prepare a written report that documents how it has assessed plan implementation and the action items that were carried out. The report will be presented to MDH at the first scoping meeting held with the city to begin amending the WHP plan.

# Chapter 11 - Contingency Strategy

The WHP plan includes a contingency strategy that addresses disruption of the water supply caused by either contamination or mechanical failure. The city prepared this strategy using a template provided by MDH/MRWA and presented in Appendix III of this plan. A copy of this plan is available for public review during regular business hours at the city offices and is referenced in this section.

# Chapter 12 - Glossary of Terms

**Data Element.** A specific type of information required by the Minnesota Department of Health to prepare a wellhead protection plan.

**Drinking Water Supply Management Area (DWSMA).** The surface and subsurface areas surrounding a public water supply well, including the wellhead protection area, that must be managed by the entity identified in the wellhead protection plan. (Minnesota Rules, part 4720.5100, subpart 13). This area is delineated using identifiable landmarks that reflect the scientifically calculated wellhead protection area boundaries as closely as possible.

**Emergency Response Area (ERA).** The part of the wellhead protection area that is defined by a one-year time of travel within the aquifer that is used by the public water supply well (Minnesota Rules part 4720.5250, subpart 3). It is used to set priorities for managing potential contamination sources within the DWSMA.

**Inner Wellhead Management Zone (IWMZ).** The land that is within 200 feet of a public water supply well (Minnesota Rules, part 4720.5100, subpart 19). The City of Lafayette must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

**Nonpoint Source Contamination.** Refers to contamination of the drinking water aquifer that is caused by polluted runoff or pollution sources that cannot be attributed to a specifically defined origin, e.g., runoff from agricultural fields, feedlots, or urban areas.

**Point Source Contamination.** Refers to contamination of the drinking water aquifer that is attributed to pollution arising from a specifically defined origin, such as discharge from a leaking fuel tank, a solid waste disposal site, or an improperly constructed or sealed well.

**Primary Water Supply Well.** A well that is regularly pumped by a public water supply system to provide drinking water.

**Vulnerability.** Refers to the likelihood that one or more contaminants of human origin may enter either 1) a water supply well that is used by the City of Lafayette or 2) an aquifer that is a source of public drinking water.

**WHP Area (WHPA).** The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, part 103I.005, subdivision 24).

**WHP Plan Goal.** An overall outcome of implementing the WHP plan, e.g., providing for a safe and adequate drinking water supply.

**WHP Measure.** A method adopted and implemented by a City of Lafayette to prevent contamination of a public water supply, and approved by the Minnesota Department of Health under Minnesota Rules, parts 4720.5110 to 4720.5590.

**WHP Plan Objective.** A capability needed to achieve one or more WHP goals, e.g., implementing WHP measures to address high priority potential contamination sources within 5 years.

## Chapter 13 - List of Acronyms

| | |
|---|---|
| AST | Above Ground Storage Tank |
| BMP | Best Management Practices |
| DNR | MN Department of Natural Resources |
| DWSMA | Drinking Water Supply Management Area |
| IWMZ | Inner Wellhead Management Zone |
| LUST | Leaking Underground Storage Tank |
| MDA | MN Department of Agriculture |
| MDH | MN Department of Health |
| Mg/l | Milligrams per Liter |
| Mg/y | Million Gallons per Year |
| MN | Minnesota |
| MPCA | MN Pollution Control Agency |
| MRWA | Minnesota Rural Water Association |
| P&Z | Planning & Zoning |
| PCSI | Potential Contaminant Source Inventory |
| PWS | Public Water Supply |
| RST | Registered Storage Tank |
| SWCD | Soil & Water Conservation District |
| TOT | Time of Travel |
| UST | Underground Storage Tank |
| WHP | Wellhead Protection |
| WHPA | Wellhead Protection Area |

# APPENDICIES

## Appendix I – WHP Plan Part 1

## Appendix II – Potential Contaminant Source Inventory

## Appendix III – Contingency Plan

## Appendix IV – Figures & Supporting Documentation

# Appendix I

**WHP PLAN PART 1**

**WELLHEAD PROTECTION AREA DELINEATION**
**DRINKING WATER SUPPLY MANAGEMENT AREA DELINEATION**
**WELL AND DWSMA VULNERABILITY ASSESSMENTS**

# Wellhead Protection Plan
# Amendment

## Part I

## Wellhead Protection Area Delineation
## Drinking Water Supply Management Area Delineation
## Well and Drinking Water Supply Management Area Vulnerability Assessments

## For

City of Lafayette

**December 2010**

**Stephen W. Robertson, P.G.**

**Minnesota Department of Health**

# Table of Contents

**Page**



**List of Tables**

## Table of Contents - Continued

**List of Figures** **Page**

# Glossary of Terms

**Date Element.** A specific type of information required by the Minnesota Department of Health to prepare a wellhead protection plan.

**Drinking Water Supply Management Area (DWSMA).** The area delineated using identifiable land marks that reflects the scientifically calculated wellhead protection area boundaries as closely as possible (Minnesota Rules, part 4720.5100, subpart 13).

**Drinking Water Supply Management Area Vulnerability.** An assessment of the likelihood that the aquifer within the DWSMA is subject to impact from land and water uses within the wellhead protection area. It is based upon criteria that are specified under Minnesota Rules, part 4720.5210, subpart 3.

**Emergency Response Area (ERA).** The part of the wellhead protection area that is defined by a one-year time of travel within the aquifer that is used by the public water supply well (Minnesota Rules, part 4720.5250, subpart 3). It is used to set priorities for managing potential contamination sources within the DWSMA.

**Inner Wellhead Management Zone (IWMZ).** The land that is within 200 feet of a public water supply well (Minnesota Rules, part 4720.5100, subpart 19). The public water supplier must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

**Wellhead Protection.** A method of preventing well contamination by effectively managing potential contamination sources in all or a portion of the well's recharge area.

**Wellhead Protection Area (WHPA).** The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, part 103I.005, subdivision 24).

**Well Vulnerability.** An assessment of the likelihood that a well is at risk to human-caused contamination, either due to its construction or indicated by criteria that are specified under Minnesota Rules, part 4720.5550, subpart 2.

## Acronyms

**CWI -** County Well Index

**DNR** - Minnesota Department of Natural Resources

**EPA** - United States Environmental Protection Agency

**FSA -** Farm Security Administration

**MDA** - Minnesota Department of Agriculture

**MDH** - Minnesota Department of Health

**MGS** - Minnesota Geological Survey

**MnDOT** - Minnesota Department of Transportation

**MnGEO** - Minnesota Geospatial Information Office

**MPCA** - Minnesota Pollution Control Agency

**SWCD** - Soil and Water Conservation District

**USDA -** United States Department of Agriculture

**NRCS** - Natural Resource Conservation Service

**UMN** - University of Minnesota

**USGS** - United States Geological Survey

## Introduction

The Minnesota Department of Health (MDH) developed Part I of the wellhead protection (WHP) plan at the request of the city of Lafayette (public water supply identification number 1520002). The work was performed in accordance with the Minnesota Wellhead Protection Rule, parts 4720.5100 to 4720.5590. This work represents an amendment to the previous wellhead protection plan for Lafayette that was approved in 2002.

This report presents the delineation of the wellhead protection area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the city of Lafayette's wells and DWSMA. It also documents the technical information that was required to prepare this portion of the WHP plan in accordance with the Minnesota Wellhead Protection Rule. Additional technical information is available from MDH.

The wells used by Lafayette, and that will be considered part of the wellhead protection planning process, are described in Section 3.1 of this report. Figure 1 shows the WHPA, the DWSMA, and the well locations. Figure 1 also shows the emergency response area (ERA), which is defined by a 1-year time of travel. An inner wellhead management zone (IWMZ), which is the area within a 200-foot radius around the well, serves as the wellhead protection area for emergency wells and is not displayed in this report. Definitions of rule-specific terms that are used are provided in the "Glossary of Terms." Section 4.3 discusses the differences between the delineation completed in 1996 and the current delineation described in this report.

## Assessment of the Data Elements

MDH staff met with representatives of the public water supplier on August 25, 2010, for a scoping meeting that identified the data elements required to prepare Part I of the WHP plan. Table 1 presents the assessment of these data elements relative to the present and future implications of planning items that are specified in Minnesota Rules, part 4720.5210.

**Table 1 - Assessment of Data Elements**

| Data Element | Present and Future Implications | | | | Data Source |
|---|---|---|---|---|---|
| | Use of the Well (s) | Delineation Criteria | Quality and Quantity of Well Water | Land and Groundwater Use in DWSMA | |
| **Precipitation** | | | | | |
| **Geology** | | | | | |
| Maps and geologic descriptions | M | H | H | H | Lusardi (2009) and Lusardi and Lively (2009) |
| Subsurface data | M | H | H | H | CWI, DNR |
| Borehole geophysics | M | H | H | H | CWI |
| Surface geophysics | L | L | L | L | None available |
| Maps and soil descriptions | | | | | |

| Data Element | Present and Future Implications | | | | Data Source |
|---|---|---|---|---|---|
| | Use of the Well (s) | Delineation Criteria | Quality and Quantity of Well Water | Land and Groundwater Use in DWSMA | |
| Eroding lands | | | | | |
| **Water Resources** | | | | | |
| Watershed units | | | | | |
| List of public waters | | | | | |
| Shoreland classifications | | | | | |
| Wetlands map | | | | | |
| Floodplain map | | | | | |
| **Land Use** | | | | | |
| Parcel boundaries map | L | H | L | L | Nicollet County |
| Political boundaries map | L | H | L | L | City of Lafayette; Nicollet County |
| PLS map | L | H | L | L | MnGEO |
| Land use map and inventory | | | | | |
| Comprehensive land use map | | | | | |
| Zoning map | | | | | |
| **Public Utility Services** | | | | | |
| Transportation routes and corridors | | | | | |
| Storm/sanitary sewers and PWS system map | | | | | |
| Oil and gas pipelines map | | | | | |
| Public drainage systems map or list | | | | | |
| Records of well construction, maintenance, and use | H | H | H | H | City of Lafayette, CWI, MDH files |
| **Surface Water Quantity** | | | | | |
| Stream flow data | | | | | |
| Ordinary high water mark data | | | | | |
| Permitted withdrawals | | | | | |
| Protected levels/flows | | | | | |
| Water use conflicts | | | | | |
| **Groundwater Quantity** | | | | | |
| Permitted withdrawals | H | H | H | H | DNR SWUDS database |
| Groundwater use conflicts | H | H | H | H | DNR |
| Water levels | H | H | H | H | DNR special studies (unpublished data) re: water supply for Heartland Corn Products |
| **Surface Water Quality** | | | | | |
| Stream and lake water quality management classification | | | | | |
| Monitoring data summary | | | | | |
| **Groundwater Quality** | | | | | |
| Monitoring data | H | H | H | H | MDH compliance and investigative monitoring, city data |
| Isotopic data | H | H | H | H | MDH investigative sampling |
| Tracer studies | H | H | H | H | None available |
| Contamination site data | M | M | M | M | MPCA, MDA |
| Property audit data from contamination sites | | | | | |

| Data Element | Present and Future Implications | | | | Data Source |
|---|---|---|---|---|---|
| | Use of the Well (s) | Delineation Criteria | Quality and Quantity of Well Water | Land and Groundwater Use in DWSMA | |
| MPCA and MDA spills/release reports | | | | | |

**Definitions Used for Assessing Data Elements:**

**High (H) -** the data element has a direct impact
**Moderate (M) -** the data element has an indirect or marginal impact
**Low (L) -** the data element has little if any impact
**Shaded -** the data element was not required by MDH for preparing the WHP plan

## General Descriptions

### o Description of the Water Supply System

The public water supplier obtains its drinking water supply from two primary wells. Table 2 summarizes information regarding them.

**Table 2 - Water Supply Well Information**

| Local Well Name | Unique Number | Use/ Status[1] | Casing Depth (feet) | Well Depth (feet) | Date Constructed | Well Vulnerability | Aquifer[2] |
|---|---|---|---|---|---|---|---|
| 1 | 209735 | P | 365 | 373 | 1946 | Not Vulnerable | QBAA |
| 3 | 232489 | P | 344 | 374 | 1975 | Not Vulnerable | QBAA |

Note: 1. Primary (P)
2. QBAA = Quaternary Buried Artesian Aquifer (deeply buried sand and gravel)

### o Description of the Hydrogeologic Setting

The description of the hydrologic setting for the aquifer that is used to supply drinking water is presented in Table 3.

**Table 3 - Description of the Hydrogeologic Setting**

| Attribute | Descriptor | Data Source |
|---|---|---|
| Aquifer Material | Sand and Gravel | Well logs in CWI database |
| Porosity (type and value) | 0.25 | Freeze and Cherry (1979) |
| Aquifer Thickness | 23 ft (7.01 Meters) | Geologic record on log of city well (232489) |
| Stratigraphic Top Elevation | 660 - 710 ft MSL (201.17 - 216.4 m) | Logs from city wells and other wells in CWI. |
| Stratigraphic Bottom Elevation | 630-680 ft, MSL (192 - 207.3 m) | Logs from city wells and other wells in CWI. |
| Hydraulic Confinement | Confined | Well logs in CWI |
| Transmissivity (T) | Reference Value: 1970 $ft^2$/day (183 $m^2$/d) | The aquifer test plan was approved on September 28, 2010, and T was determined from a pumping test on city Well 1 (209735) in 1996. |
| Hydraulic Conductivity | Reference Value: 85.7 ft/day (26.1 m/d) | The reference value was obtained from the reference transmissivity value. |
| Groundwater Flow Field | See Figure 2 - Potentiometric Surface Showing Groundwater Elevation Contours | Defined by using static water level elevations from well records in the CWI database. |

Figures 3, 4, and 5 show the distribution of the aquifer and its stratigraphic relationships with adjacent geologic materials. Each of these figures was prepared using well record data that is contained in the CWI database. The geological maps and studies that were used to further define local hydrogeologic conditions are provided in the "Selected References" section of this report.

## Delineation of the Wellhead Protection Area

### o Delineation Criteria

The boundaries of the WHPA for the public water supplier are shown in Figure 1. Table 4 describes how the delineation criteria that are specified under Minnesota Rules, part 4720.5510, were addressed.

**Table 4 - Description of WHPA Delineation Criteria**

| Criterion | Descriptor | How the Criterion was Addressed |
|---|---|---|
| Flow Boundary | None | There are no flow boundaries close enough to the city wells that may have an impact on their capture areas. |
| Flow Boundary | Other High-Capacity Wells | No high-capacity wells are present in close proximity to the city wells. Accordingly, no other wells were considered in the WHPA analysis. |
| Daily Volume of Water Pumped | See Table 5 | Pumping information was obtained from the Minnesota Department of Natural Resources Appropriations Permit PA-1977-4348. |
| Groundwater Flow Field | See Figure 2 | The model calibration process addressed the relationship between the calculated versus observed groundwater flow field. |
| Aquifer Transmissivity | See Table 4 | A single transmissivity value was used to reflect aquifer properties determined in the pumping test. |
| Time of Travel | 10 years | The public water supplier selected a 10 year time of travel. |

Information provided by the city of Lafayette was used to identify the maximum volume of water pumped annually by each well over the previous five-year period, as shown in Table 5. Previous pumping values have been reported to the DNR as required by the city's Groundwater Appropriation Permit No. 1977-4348. Also, the estimated pumping in 2015 is shown as an average of the values reported from 2004-2009 because no changes are expected that will affect system water use in the future. The maximum daily volume of discharge used as an input parameter in the model was calculated by dividing the greatest annual pumping volume by 365 days.

**Table 5**
**Annual Volume of Water Discharged from Water Supply Wells**

| Well Name/ Number | 2005 | 2006 | 2007 | 2008 | 2009 | Projected 2015 |
|---|---|---|---|---|---|---|
| 1 (209735) | Not Separately Metered | | | | | 7.55 |
| 3 (232489) | | | | | | 7.55 |
| System Total | 14.9 | **16.1** | 15.9 | 14.2 | 14.2 | 15.1 |

Source: The DNR State Water Use Database System (SWUDS), Permit Number 1979-4348. Expressed as millions of gallons per year. Bolded value represents value used in WHPA delineation.

In addition to the wells used by the public water supplier, a search of the DNR's SWUDS database was conducted to determine if any high-capacity wells are present in the Lafayette area. None were found. Also, Mr. Allan Fox, with the city of Lafayette, was not aware of any near the city's wells.

## o Method Used to Delineate the Wellhead Protection Area

The WHPA for the public water supply wells was determined using a combination of two methods. The first involved calculating the groundwater capture zone deterministically using representative aquifer parameters that were input into MLAEM, a groundwater modeling code. The second approach used the analytical groundwater flow method named ONEKA (Barnes and Soule, 2010). The results of these separate analyses are presented in Figure 6. Furthermore, the results were composited to make the WHPA boundaries (Figure 6). The input files for both models are available at MDH upon request.

The MLAEM code was used for the Lafayette delineation in a manner very similar to the way in which the U.S. Environmental Protection Agency's WHPA code (Blandford and Huyakorn, 1991) was used for the city's last delineation (MDH, 1996). The WHPA Code is a semi-quantitative method for estimating the capture zones for wells that produces a conservative estimate because aquifer recharge is not used as an input parameter. It is appropriate to use MLAEM in this manner for this delineation because no flow boundaries are known to exist in the upgradient direction of groundwater flow from the wells, at least in the areas defined by a one-year and ten-year time of travel.

A second code, using the analytical groundwater flow method named ONEKA (Barnes and Soule, 2010) was used to assess the probability of impacts that local variations in hydrogeologic conditions may have on a well capture zone. This model treats the aquifer properties and the available water level measurements as variable input parameters. The locations of wells, water levels, and the aquifer geometry were evaluated using information from the CWI database. For the solution, ONEKA finds

the flow field that best fits the network of water level elevations by varying the values of the aquifer thickness and transmissivity. ONEKA then evaluates the probability of the capture of a given point based on the number of times it is included in the capture areas generated by the total number of solutions. The output from the model is a capture zone probability map for the specified time of travel (i.e., 10 years).

### o Differences Between New and Old WHPA and DWSMA Delineations

The previous WHPA analysis and DWSMA delineation were completed for Lafayette in 1996. In the fourteen subsequent years, some new data has accumulated in the form of point data from new or newly located wells. Data from the deep aquifer tapped by the city's wells are still sparse, but the new data suggest the groundwater flow direction is different than it was earlier interpreted to be.

The general approach used to generate the WHPA delineation is basically the same as before, except that newer computer codes were used to do the analysis. These codes offer more sophisticated handling of uncertain hydrologic parameters than was available before. Accordingly, the new analysis considers a wider range of possible aquifer thickness values than was done previously.

Finally, the pumping volumes used in the current analysis are significantly smaller than was used previously. In the intervening years, city staff have successfully eliminated substantial system losses– hence less water has been pumped by the city's wells.

Together these changes result in a WHPA that is smaller than what was previously delineated and extends in a northerly direction instead of a westerly direction.

### o Results of Model Calibration and Sensitivity Analysis

**Model calibration** is a procedure that compares the results of a groundwater flow model based on estimated input values to measured or known values. This procedure can be used to define model validity over a range of input values, or it helps determine the level of confidence with which model results may be used. As a matter of practice, groundwater flow models are usually calibrated using water elevation or flux.

The modeling approach used to prepare the WHPA delineation for Lafayette using MLAEM is analogous to the type of solution obtained using the WHPA Code. Each of these approaches is used to simulate groundwater flow in deeply confined settings. The area around Lafayette, like many other such settings, offers few nearby groundwater elevation measurements with which computed model results can be compared. Hence, a traditional calibration process was not attempted for this delineation. Instead, the input parameters for the MLAEM Model were prepared using hydrogeologic judgement based on available data. The WHPA was computed using an analysis that is based on calculating flowpath lines using equations that reflect 1) a constant pumping rate, 2) direction of groundwater flow, 3) hydraulic gradient, 4) aquifer thickness, 5) aquifer permeability, and 6) aquifer porosity. As such, it is a simple calculation of the portion of the aquifer that contributes water, based on the width of the flow field that is affected by pumping.

The ONEKA Model is used to support the MLAEM results by using an iterative process which provides the best fit for the ranges of values assigned to its input parameters. This helps to define the subset of values for which the delineation results are most likely to reflect local hydrogeologic conditions and, therefore, provide the best calibration results.

**Model sensitivity** is the amount of change in model results caused by the variation of a particular input parameter. Because of the simplicity of the manner in which the MLAEM code was employed in generating the WHPA, the direction and extent of the modeled capture zone may be very sensitive to any of the input parameters:

- The pumping rate directly affects the volume of the aquifer that contributes water to the well. An increase in pumping rate leads to an equivalent increase in the volume of aquifer within the capture zone, proportional to the porosity of the aquifer materials. However, the pumping rate is based on the results presented in Table 5 and, therefore, is not a variable factor that will influence the delineation of the WHPA.
- The direction of groundwater flow determines the orientation of the capture area. Variations in the direction of groundwater flow will not affect the size of the capture zone but are important for defining the areas that are the source of water to the well. The ambient groundwater flow field that is defined in Figure 2 provides the basis for determining the extent to which each model run reflects the conceptual understanding of the orientation of the capture area for a well. Uncertainty in flow field direction is addressed in Section 4.4.
- Hydraulic gradients of zero produce a circular capture zone, centered on the well. As the hydraulic gradient increases, the capture zone changes into an elliptical shape, with the well centered on the down-gradient focal point. The hydraulic gradient was determined by using water level elevations that were taken from wells that have verified locations (Figure 2). Generally, the accuracy of the hydraulic gradient determination is directly proportional to the amount of available data that describes the distribution of hydraulic head in the aquifer.
- The aquifer thickness, permeability, and porosity influence the size and shape of the capture zone. A decrease in either thickness or porosity causes a linear, proportional increase in the areal extent of the capture zone; whereas permeability defines the relative proportions of the capture zone width to length. A decrease in permeability decreases the length of the capture zone and increases the distance to the stagnation point, making the capture zone more circular in shape and centered around the well.

Of these, the primary parameters addressed in the uncertainty analysis are the direction of groundwater flow and the aquifer thickness, which was generalized for the delineation.

### o Addressing Model Uncertainty

Using computer models to simulate groundwater flow necessarily involves representing a complicated natural system in a simplified manner. Local geologic conditions may vary within the capture area of the city wells, but the amount of existing information that is needed to accurately define this degree of variability is often not available for portions of the WHPA. In addition, the current capabilities of groundwater flow models may not be sufficient to represent the natural flow system exactly. However, the results are valid within a range defined by the reasonable variation of input parameters for this delineation setting.

The MLAEM Code, used as it was for this delineation, has limited capabilities to address these kinds of uncertainties, other than by using multiple runs in which the following the six input parameters are varied: 1) constant pumping rate, 2) hydraulic gradient, 3) direction of ambient flow, 4) aquifer thickness, 5) aquifer permeability, and 6) porosity). The uncertainty is associated with the results from 1) the model deficiencies mentioned above, 2) the sensitivity of the code itself, and 3) the fact that the model was not calibrated.

The steps employed for this delineation to address model uncertainty were:

1) Pumping Rate - For each well, a maximum historical (five-year) pumping rate or an engineering estimate of future pumping, whichever is greater (Minnesota Rules, part 4720.5510, subpart 4).
2) Ambient Flow Field - A composite of capture zones created from angles of flow that are 10 degrees greater and 10 degrees lesser than the representative angle of ambient flow (Minnesota Rules, part 4720.5510, subpart 5, B(2).

Input values used in the MLAEM analysis are presented in Table 6.

**Table 6 - Model Parameters Used in MLAEM Code Model Runs**

| Well Name | File Name | Discharge $m^3$/day | Transmissivity $m^2$/day | Uniflow ($m^2$/day) | Flow Angle (N of E) | Porosity % | Aquifer Thickness (meters) | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1, 3 | Lafayette.dat | 83.5 (per well) | 183 | 0.47 | 260 | 0.25 | 7.01 | Base |
| 1, 3 | Lafayette.dat | 83.5 (per well) | 183 | 0.47 | 250 | 0.25 | 7.01 | Flow direction changed by negative 10 degrees. |
| 1, 3 | Lafayette.dat | 83.5 (per well) | 183 | 0.47 | 270 | 0.25 | 7.01 | Flow direction changed by positive 10 degrees. |

The ONEKA Model helps to address the uncertainties that are related to aquifer parameters as well as variations of the flow field. In particular, aquifer thickness is observed to vary considerably in the few wells that exist in the deep QBAA near Lafayette. A statistical analysis of 17 wells that fully pierce the deep sand and gravel aquifer indicates the mean thickness across the area is 1.8 meters and that the distribution of values has a standard distribution of about 1 (Table 7). These values were used in the ONEKA analysis by making a series of runs spanning two standard distributions on either side of the mean to account for about 95 percent of the distribution. A 10-year capture zone based on the 40 percent probability map (Figure 6) – that is, capturing 60 percent of the simulated pathlines – was generated for the city wells; the values used for the ONEKA Model are shown in Table 7. The ONEKA results generally coincide with the capture zones calculated from the MLAEM approach, but differ in that they are slightly more conservative and the orientation of groundwater flow is slightly more to the southeast. The probability map for the city wells shows that uncertainty of the capture zone increases as the distance from the city wells increases (Figure 6).

**Table 7 - Range of Values Used for the ONEKA Model**

| Well Number | File Name | Hydraulic Conductivity | Thickness | Porosity |
|---|---|---|---|---|
| 1 | Laf3 | 85.7 ft/d | 23 ft (log mean = 2.93, stdev = 0.999) | 0.25 |
| 3 | Laf3 | 85.7 ft/d | 23 ft (log mean = 2.93, stdev = 0.999) | 0.25 |

## Delineation of the Drinking Water Supply Management Area

The boundaries of the Drinking Water Supply Management Area (DWSMA) were defined by the city of Lafayette using the following features (Figure 1):

- Center-lines of highways, streets, roads, or railroad rights-of-ways;
- Public Land Survey coordinates;
- Property or fence lines; and
- Center-lines of public drainage systems.

## Vulnerability Assessments

The Part I wellhead protection plan includes the vulnerability assessments for the city of Lafayette's wells and the DWSMA. These vulnerability assessments are used to help define potential contamination sources within the DWSMA and to select appropriate measures for reducing the risk that they present to the public water supply.

### o Assessment of Well Vulnerability

The vulnerability assessment for each well used by the city of Lafayette is listed in Table 2 and is based upon the following conditions:

1) It is unclear from the incomplete well logs for each of the city wells if they meet current Well Code (Minnesota Rules, part 4725) construction specifications. In particular, one concern is with regard to grouting. Well 1 (209735) was constructed at a time when the only drilling method commonly used in Minnesota was cable tool. Wells drilled using cable tool techniques need not be full-length grouted, so it is likely this well meets current standards. The well record for Well 3 (232489) lacks information about both the drilling technique and the grout installed, but the well was constructed at a time when other drilling methods, some of which require grouting under current rules, were also being used in Minnesota. Without knowing more about the well installation, there is concern that Well 3 (232489) may not meet current standards. However, the lack of any signs of surficial contamination in the well water indicates that the wells do not provide a pathway for contaminants to enter the aquifer used by the public water supplier.
2) The geologic conditions at the well sites include a cover of clay-rich geologic materials over the aquifer that is sufficient to retard or prevent the vertical movement of contaminants.
3) None of the human-caused contaminants regulated under the federal Safe Drinking Water Act have been detected at levels indicating that any of the city wells serve to draw contaminants into the aquifer as a result of pumping.

### Assessment of Drinking Water Supply Management Area Vulnerability

The vulnerability of the DWSMA is very low. This conclusion is based upon the following information:

1) Isotopic and water chemistry data from wells located within the DWSMA indicate that the aquifer contains water that has no detectable levels of tritium or human-caused contamination; and
2) Review of the geologic logs contained in the CWI database and geological maps and reports indicate that the aquifer exhibits a very low geologic sensitivity throughout the DWSMA and is isolated from the direct vertical recharge of surface water.

## Selected References


Barnes, R.J., and Soule, R.G. (August 25, 2010), *ONEKA: A simple analytical element model for stochastic capture zone delineation*, St. Paul, Minn., draft paper.

Blandford, T.N., and Huyakorn, P.S. (1991), *WHPA 2.0: A modular semi-analytical model for the delineation of wellhead protection areas*, EPA 68-08-0003, U.S. Environmental Protection Agency, Office of Ground-Water Protection, Washington, D.C., 246 p.

Geologic Sensitivity Project Workgroup (1991), *Criteria and guidelines for assessing geologic sensitivity of ground water resources in Minnesota*, Minnesota Department of Natural Resources, Division of Waters, St. Paul, Minn., 122 p.

Freeze, R.A., and Cherry, J.A. (1979), *Groundwater*, Prentice Hall, Englewood Cliffs, N.J., 553 p.

Lusardi, B.A., and Lively, R.S. (2009), Quaternary stratigraphy and sand distribution model, in *Geologic atlas of McLeod County, Minnesota*, Lusardi, B.A. (Project mgr.), County Atlas Series, C-20, Part A, Plate 5, Minnesota Geological Survey, St. Paul, Minn., scales 1:100,000 and 1:200,000.

Minnesota Department of Health (1996), *Wellhead protection plan for the city of Lafayette, Minnesota--Part 1*, St. Paul, Minn., 26 p.

# Figures

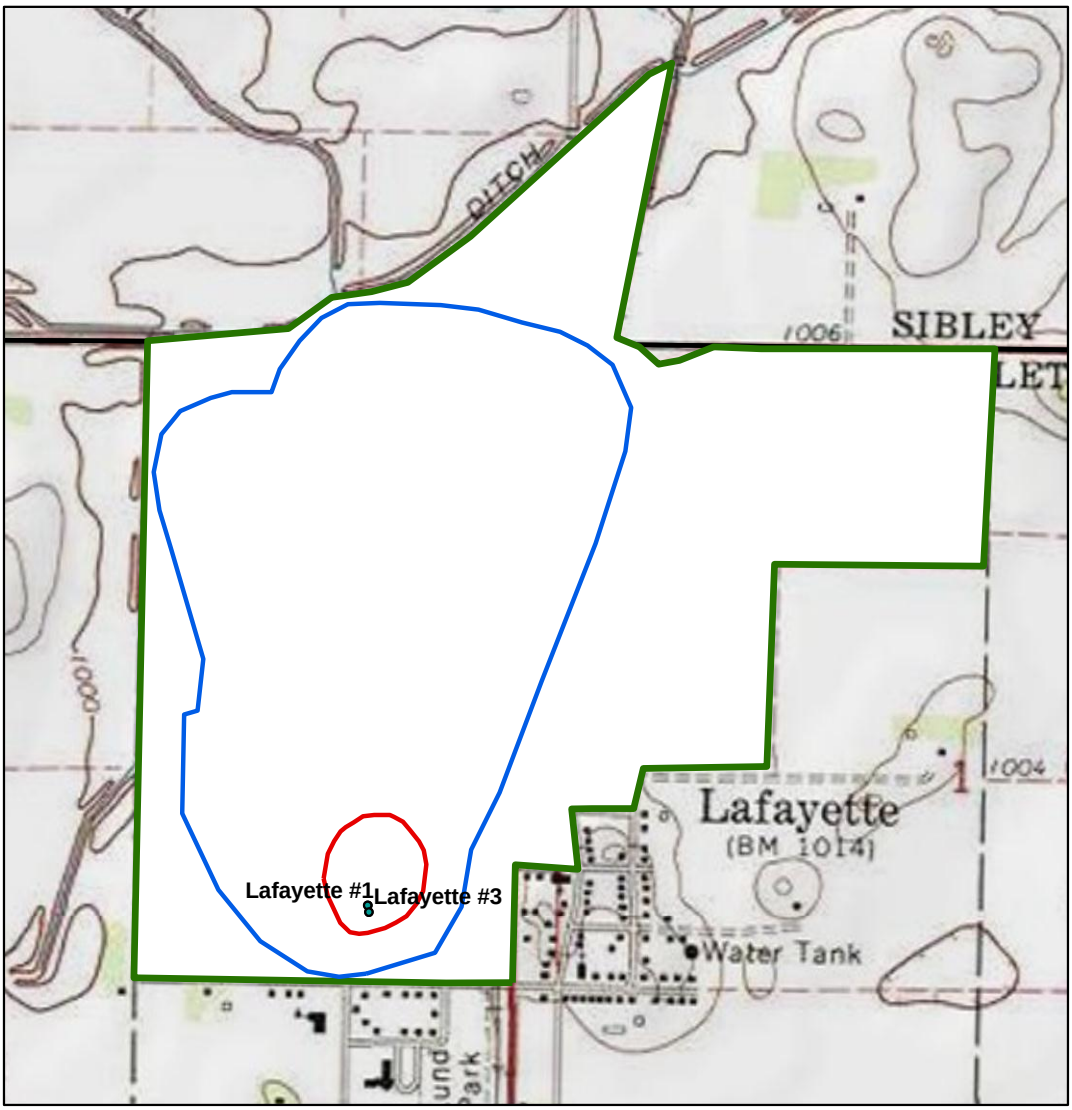


**Figure 1.**
**Wellhead Protection Area and Drinking Water Supply Management Area**
**City of Lafayette**

**Legend**

- Emergency Response Area
- Wellhead Protection Area
- Drinking Water Supply Management Area

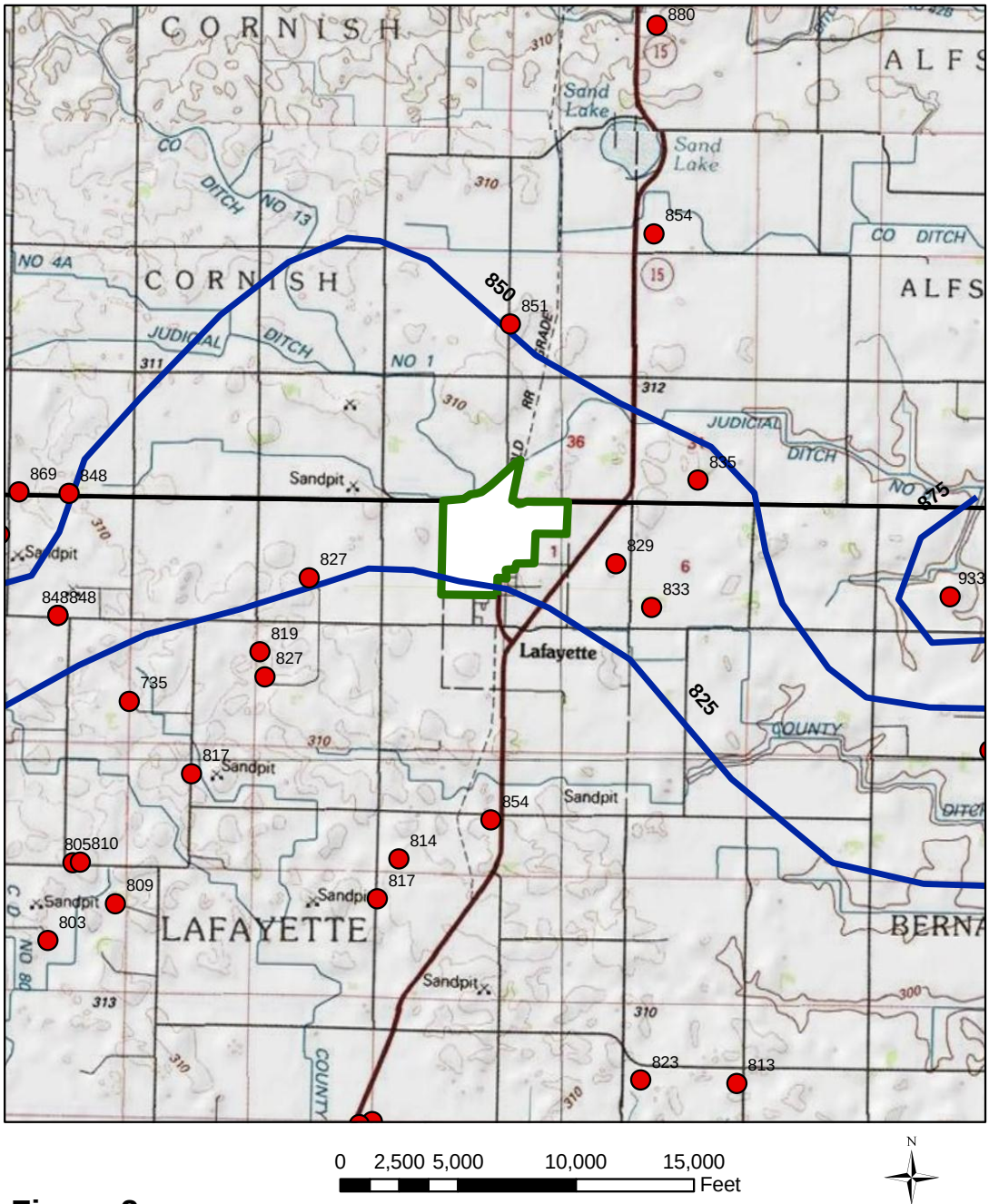


**Figure 2.**
**Potentiometric Surface Showing Groundwater Elevation Contours City of Lafayette**

**Legend**

- Located QBAA Wells (Elevation < 730')
- Groundwater Levels
- DWSMA

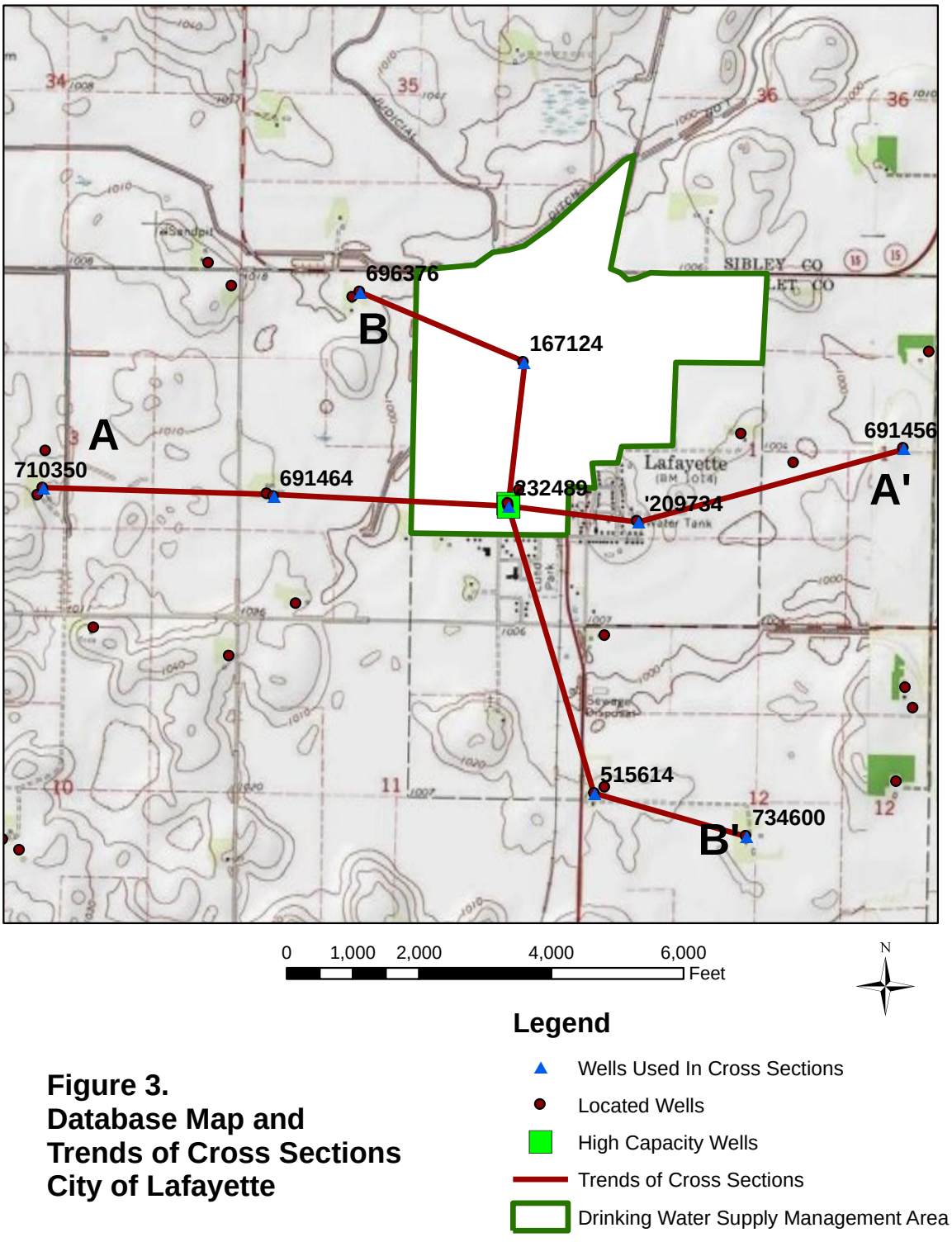


**Figure 3.**
**Database Map and**
**Trends of Cross Sections**
**City of Lafayette**

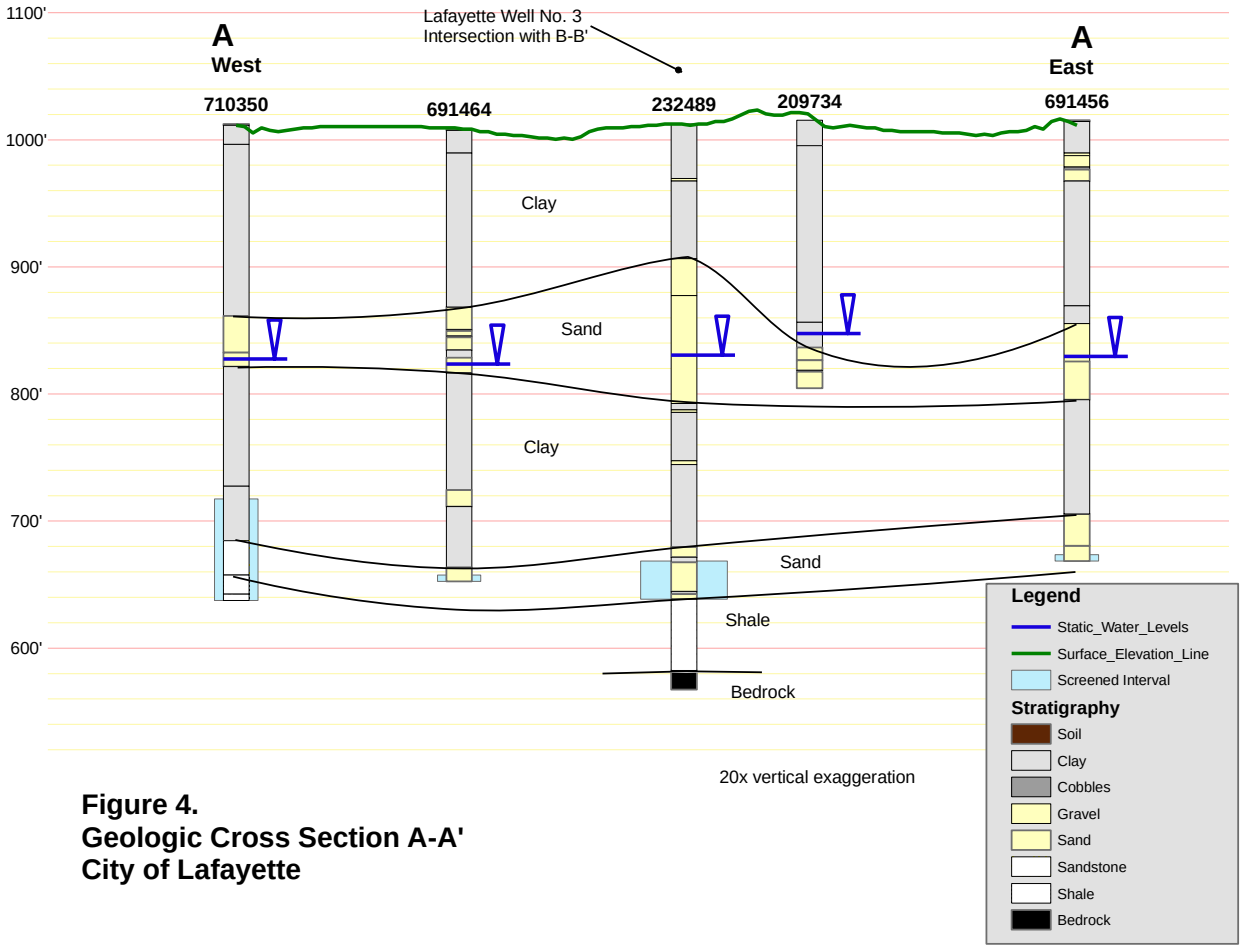


**Figure 4.**
**Geologic Cross Section A-A'**
**City of Lafayette**

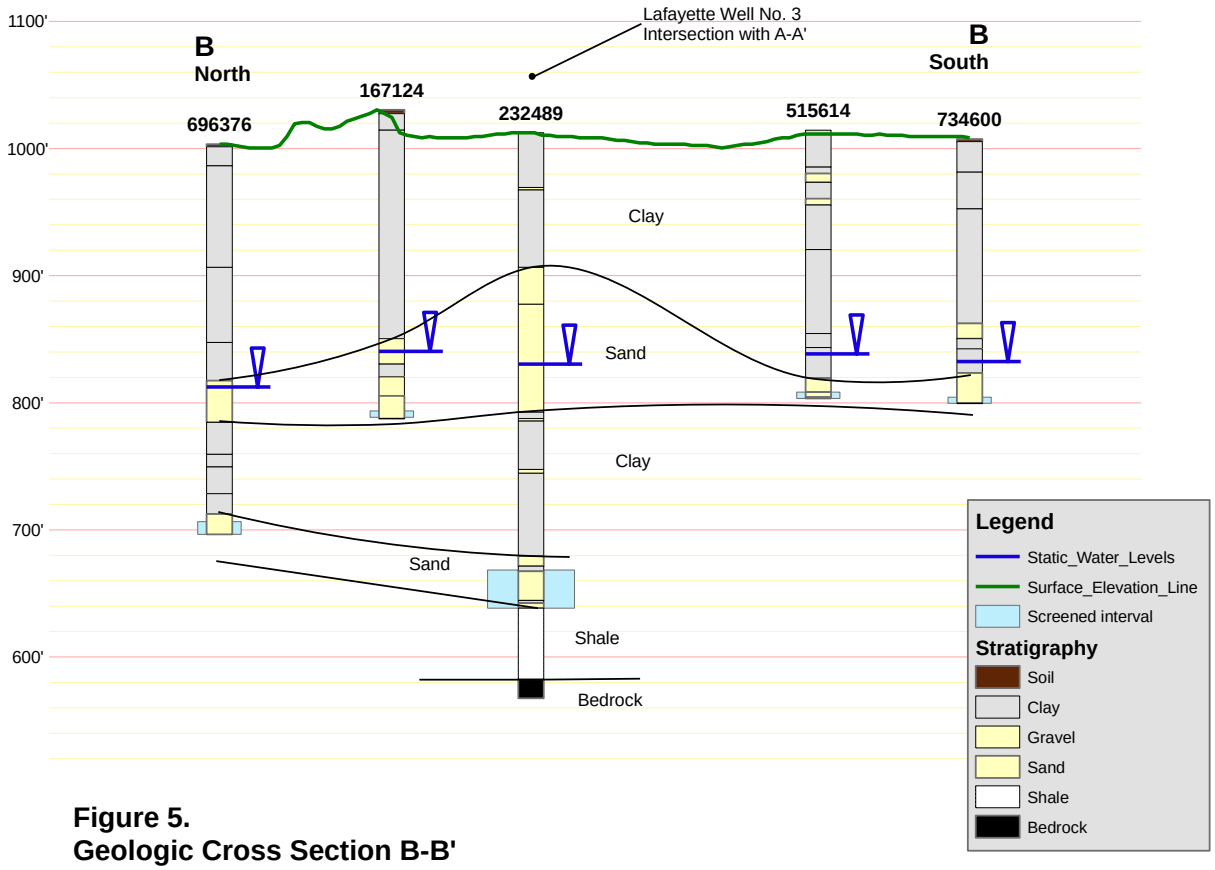


**Figure 5.**
**Geologic Cross Section B-B'**
**City of Lafayette**

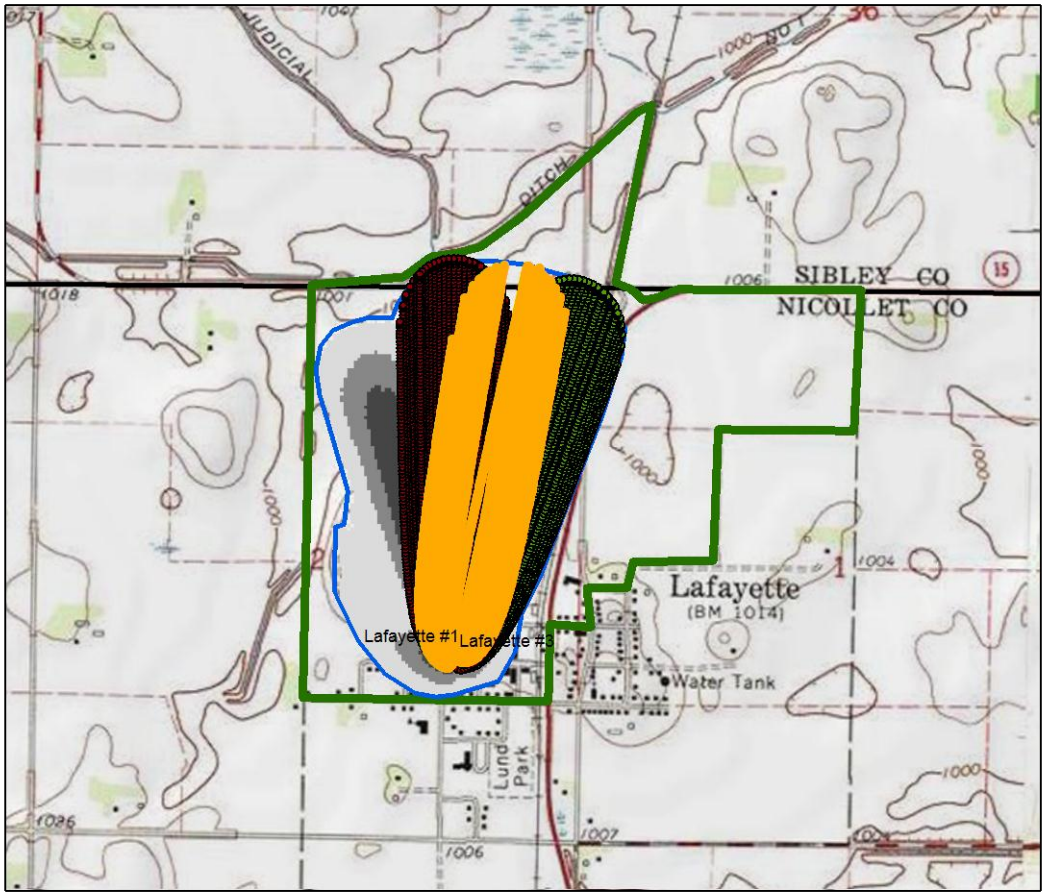


**Figure 6.**
**Groundwater Capture Zones**
**MLAEM and ONEKA WHPA**
**Delineation Analysis**
**City of Lafayette**

# Appendix II

## INVENTORY OF POTENTIAL CONTAMINANT SOURCES

# Lafayette
## PCSI Report

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 1 | Hagberg, Matthew | | 800 6th St | Lafayette | 56054 | 15.002.0205 | | 6.78 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 1 | Well | Active | | 243FT | CWI | 167124 | Isenberg, Robert |
| 19 | Spill | Closed | Pesticides | 0 | MDA | CF-4019 | Old Emergency Incidents closed 1/2/2001 |
| 20 | Spill | Closed | Unspecified material | 0 | MDA | 91-0003 | Old Emergency Incidents closed 5/16/1994 |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 2 | City of Lafayette | | 620 Main Ave | Lafayette | 56054 | 15.681.0265 | | 0.09 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 2 | Well | Active | | 373FT | CWI | 209735 | Lafayette 1 |
| 3 | Well | Active | | 445FT | CWI | 232489 | Lafayette 3 |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 3 | City of Lafayette (Butcher Block) | | 640 Pioneer Ave | Lafayette | 56054 | 15.681.0080 | | 0.64 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 4 | Well | Sealed | | 350FT | CWI | 241998 | Lafayette 2 |
| 10 | Well | Sealed | | 105FT | SEAL | H0059553 | Meyer, Edwin |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 4 | Meschke, Phillip | | 520 Main Ave | Lafayette | 56054 | 15.681.0220 | | 0.19 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 5 | Well | Inactive | | 0 | | | |

# Lafayette

## PCSI Report

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 5 | Brethorst, Thomas R | | 500 Pioneer Ave | Lafayette | 56054 | 15.681.0140 | | 0.32 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 6 | Well | Active | | 0 | | | |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 6 | Krueger, Larry D | | 520 Pioneer Ave | Lafayette | 56054 | 15.681.0150 | | 0.16 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 7 | Well | Inactive | | 0 | | | |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 7 | Dick, Mark H | | 571 6th St | Lafayette | 56054 | 15.681.0180 | | 0.34 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 8 | Well | Inactive | | 0 | | | |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 8 | Burger, David L | | 580 Main Ave | Lafayette | 56054 | 15.681.0250 | | 0.29 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 9 | Well | Sealed | | 38FT | SEAL | H0050196 | Nurenberger, Armond |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 9 | Gonzales, Greg | | 720 Pioneer Ave | Lafayette | 56054 | 15.681.0030 | | 0.32 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 11 | Well | Sealed | | 48FT | SEAL | H0027123 | Wieland, Brian |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 10 | Brethorst, Thomas R | | 791 Main Ave | Lafayette | 56054 | 15.681.0430 | | 0.19 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|

# Lafayette
# PCSI Report

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 12 | Well | Sealed | | 58FT SEAL | H0070773 | Isenberg Electric | | |
| 11 | Muscatello, Steven R | | 960 Pioneer Ave | Lafayette | 56054 | 15.411.0040 | | 0.29 |
| *Inv Id* | *Pcsi* | *Status* | *Material* | *Value* | *Program* | *Program ID* | *Inv Comments* | |
| 13 | Well | Sealed | | 54FT SEAL | H0070774 | Brethorst, Tom | | |
| 12 | Prairie Property Mgmt. | | 750 Main Ave | Lafayette | 56054 | 15.681.0300 | | 0.10 |
| *Inv Id* | *Pcsi* | *Status* | *Material* | *Value* | *Program* | *Program ID* | *Inv Comments* | |
| 14 | Well | Sealed | | 62FT SEAL | H0213907 | Vertheln, Keith | | |
| 13 | United Farmers Cooperative | | 680 Main Ave | Lafayette | 56054 | 15.681.0310 | | 0.29 |
| *Inv Id* | *Pcsi* | *Status* | *Material* | *Value* | *Program* | *Program ID* | *Inv Comments* | |
| 15 | Well | Sealed | | 41FT SEAL | H0003473 | Lloyds Feed Service | | |
| 14 | Nicollet County | | 571 7th St | Lafayette | 56054 | 15.681.0255 | | 0.48 |
| *Inv Id* | *Pcsi* | *Status* | *Material* | *Value* | *Program* | *Program ID* | *Inv Comments* | |
| 16 | Leaking underground storage tank | Completely closed | Diesel | 0 LUST | 15905 | Nicollet County Highway Department closed 11/29/2005 | | |
| 15 | Farmers Co-op Creamery Assn | | 840 Pioneer Ave | Lafayette | 56054 | 15.002.2200 | | 0.68 |
| *Inv Id* | *Pcsi* | *Status* | *Material* | *Value* | *Program* | *Program ID* | *Inv Comments* | |
| 17 | Leaking underground storage tank | Completely closed | Gasoline | 0 LUST | 4139 | Proposed Fire Station & Community Ctr closed 8/3/1992 | | |

# Lafayette

## PCSI Report

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 16 | Hartley, Jon F | | 321 2nd St | Lafayette | 56054 | 15.002.1800 | | 4.55 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 18 | Well | Sealed | | 34FT | SEAL | H0284169 | Sjogren, Dennis |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 17 | Farmers Co-op Of Lafayette | | Main St | Lafayette | 56054 | 15.002.1900 | | 3.20 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 21 | Spill | Closed | Unspecified material | 0 | MDA | 91-0041 | Old Emergency Incidents closed 11/29/1993 |
| 22 | Spill | Closed | Unspecified material | 0 | MDA | 91-0619 | Old Emergency Incidents closed 8/4/1997 |

| FID | NAME | TYPE | ADDRESS | CITY | ZIP | PIN | COMMENTS | ACRES |
|---|---|---|---|---|---|---|---|---|
| 18 | Johnson, Bette P | | 55746 340th St | Lafayette | 56054 | 15.002.0100 | | 63.82 |

| Inv Id | Pcsi | Status | Material | Value | Program | Program ID | Inv Comments |
|---|---|---|---|---|---|---|---|
| 23 | Ditch | Active | | 0 | | | |

**POTENTIAL CONTAMINANT SOURCE INVENTORY MAP**

# Appendix III

## WATER SUPPLY CONTINGENCY PLAN

# WATER SUPPLY CONTINGENCY PLAN

City of Lafayette, MN

## Table of Contents



**Annual Plan Review**

| *Date Reviewed* | *Reviewer* | *Comments* |
|---|---|---|
| 19 September 2011 | Allan E. Fox | New plan developed |
| | | |

**Plan Distribution**

| *Person* | *Organization* | *Plan Location* |
|---|---|---|
| **Allan E. Fox** | **City of Lafayette** | **City Offices / Water Facility** |
| | | |

Prepared By: Allan E. Fox

Date Approved: _____

## A. PURPOSE

The purpose of this Contingency Plan is to establish, provide and keep updated, certain emergency response procedures and information for the public water supply system which may become vital in the event of a partial or total loss of public water supply services.

## B. PUBLIC WATER SUPPLY CHARACTERISTICS

1. Current Supply Source -

| | Well Number 1 | Well Number 3 |
|---|---|---|
| **Supply Source** | Confined Aquifer | Confined Aquifer |
| **Well Depth (ft.)** | 373 | 445 |
| **Well Diameter (in.)** | 8 | 10 |
| **Latitude of Well** | 44d 27m 48.9413s | 44d 26m 48.5186s |
| **Longitude of Well** | 94d 23m 46.5808s | 94d 23m 46.4576s |
| **Well Capacity (gpm)** | 150 | 160 |
| **Well Production (gpm)** | 150 | 160 |

2. Treatment - The City of Lafayette owns and operates a class C Water Facility. The Water Facility is a rapid sand filter for Iron and Manganese removal. The Filter media has been allowed to go biological for Ammonia level reduction so the Facility has post chlorination only and uses raw well water for backwashing. Iron and manganese are removed by aeration, potassium permanganate addition. Post chemical addition consists of Fluoride, Chlorine, and C-4 corrosion inhibitor.

3. Storage and Distribution – The City of Lafayette also owns and operates the Distribution system witch is comprised of a 50,000 gallon elevated water tower, with associated pipes, valves and Fire Hydrants through out the system.

4. Maps/Plans – Plans and Maps are kept at the Lafayette City Building and at the Water Facility.

## C. PRIORITY OF WATER USERS DURING WATER SUPPLY EMERGENCY

**Table C-1 - Water Use Priority Grouping**

| Priority Group and Rank | Maximum Daily Use (gpd) | Minimum Daily Use (gpd) |
|---|---|---|
| **Residential--#1** | 45,000 | 17,000 |
| **Institutional--#2** | 10,000 | 6,000 |
| **Commercial--#3** | 5,000 | 3,000 |
| **Industrial--#4** | N/A | N/A |
| **Farm Fill--#5** | 90,000 | 1,000 |
| **Unaccounted** | 2,000 | 500 |
| **Wholesale** | N/A | N/A |

**Triggers for implementing water supply reduction/allocation procedures:**

Water-use restrictions will be implemented following natural or manmade disasters, or major mechanical failure.

## D. ALTERNATIVE WATER SUPPLY OPTIONS

1. Surface water sources and treatment needs.
   The nearest surface water is Clear Lake. Considering the distance and anticipated treatment, it seems unrealistic to consider this water source.

2. Bottled water supplies, delivery and distribution.
   Bottled water seems to be the option for the City of Lafayette. The American Red Cross will provide logistical support during a natural disaster only. The Cities of Gibbon and Winthrop have approved of letting Lafayette residence fill containers for water consumption at posted areas when needed. Cash Wise and HY VEE from New Ulm, MN, could have bottled water to the City within six hours of notification.

   HY VEE
   24-hour contact person:
   Telephone:

   Cash Wise
   24-hour contact person:
   Telephone:

3. System interconnects with other water supplies.
   City interconnection with another city also seems to be unrealistic. The closest City would be approximately nine miles away.

4. New well.
   The City of Lafayette has no new wells planned in the future.

5. Emergency or backup wells.
   The City of Lafayette has no emergency or backup wells.

6. Emergency treatment of water system.
   Water main flushing and chemical addition could be implemented when needed.

7. Source Management (blending).
   There is no other water recourse close by to achieve this.

## E. INVENTORY OF AVAILABLE EMERGENCY EQUIPMENT AND MATERIALS

Table E-1 contains a list of services, equipment and supplies that are available to the public water supply system to respond to a disruption in the water system. It is believed that the items contained in Table E-1 would be adequate to respond to most (if not all) water system emergencies.

**Table E-1**

| Description | Owner | Telephone | Location | Acquisition Time |
|---|---|---|---|---|
| **Well Repair** | Schaffer Well Co. | 507-354-2614 | New Ulm, MN. | 3hrs. |
| **Pump Repair** | Schaffer Well Co. | 507-354-2614 | New Ulm, MN. | 3hrs. |
| **Electrician** | Isenberg Electric | 507-228-8901 | Lafayette, MN. | 2hr. |
| **Plumber** | B&R Plumbing | 507-647-5362 | Winthrop, MN. | 3hrs. |
| **Backhoe** | Lafayette Excavating | 507-228-8902 | Lafayette, MN. | 2hrs. |
| **Chemical Feed** | Hawkins Chemical | 612-331-6910 | Minneapolis, MN. | 4hrs. |
| **Meter Repair** | HD Supply Waterworks | 800-752-8112 | Eden Prairie, MN. | 1 Day. |
| **Generator** | City of Lafayette | 507-276-1707 | Lafayette, MN. | 1hrs. |
| **Valves** | City of Lafayette | 507-276-1707 | Lafayette, MN. | 1hrs. |
| **Pipe & Fittings** | City of Lafayette | 507-276-1707 | Lafayette, MN. | 1hrs. |
| **Valves** | HD Supply Waterworks | 800-752-8112 | Eden Prairie, MN. | 3hrs. |
| **Pipe & Fittings** | HD Supply Waterworks | 800-752-8112 | Eden Prairie, MN. | 3hrs. |

## F. EMERGENCY IDENTIFICATION PROCEDURES

### Table F-1 Procedural Operations

| Incident | Responsible Party | Address | Telephone No.(s) | Response Procedure and Comments | |
|---|---|---|---|---|---|
| **Identify Disruption** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Identifies the nature of the water supply disruption and sends information to the City council, Alternate response coordinator, and members of the emergency oversight committee | |
| **Notify Response Personnel (Coordinator)** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Briefs City personnel and others who will be responding to water supply emergency. Identify disrupted area and coordina personnel efforts to correct disruption. | |
| **Identify Incident Direction and Control** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Identifies corrective actions needed for the water supp emergency and directs responders to implement correcti actions. | |
| **Identify Internal Communication** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Briefs the emergency oversight committee and the primary spokesperson on response activities. Updates will be provided as needed. | |
| **Inform Public** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Brief the City spokesperson with necessary information pertaining to the emergency that is ready to be released to the news media and public. | |
| **Assess Incident on Continual Basis** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Assess corrective actions on a continual basis. Update oversight committee and City council on additional corrective actions so the public can be informed of issues and progress. | |
| **Assess Contamination Disruption** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Assess the status of the contamination source and the impact to the water system. Determine the corrective actions that are needed to eliminate the contamination source and brief the City council and oversight committee. | |
| **Assess Mechanical Disruption** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Identify items that need repair to the mechanical components to the water system. Make arrangements to have the repairs or replacements completed to the impacted area of the system. | |
| **Provide Alternate Water Supply** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Determine the time needed before the disruption can be corrected. If an alternative water supply is needed, take actions to implement an alternative water supply. | |
| **Impose Water Use Restrictions** | Primary: Allan E Fox<br>Alt: Rick Timm | City of Lafayette<br>City of Lafayette | 507-276-1707<br>507-276-8104 | Identify if water use restrictions are needed. Implement water restriction use plan. Inform public of restrictions imposed. | |

## G. NOTIFICATION PROCEDURES

1. Agency Notification

Table G-1 contains the names and telephone numbers for contacts at various local and state agencies that may be notified in the event of a public water supply system emergency. Based on the nature of the emergency and the information available, various representatives from this listing will be selected by the response coordinator to be part of the ***emergency oversight committee,*** which will then meet throughout the duration of the emergency to aid in decision-making and positive outcomes.

**Table G-1. Agency Emergency Contact Listing**

| Personnel | Name | Home Telephone | Work Telephone |
|---|---|---|---|
| **Mayor/Board Chair** | Steve Langhoff | 507-228-8710 | 507-228-8710 |
| **Council Members** | Tom Sandberg | 507-228-8017 | Cell-507-240-1153 |
| **Council Members** | Darren Saffert | 507-228-8754 | Cell-507-217-0301 |
| **Council Members** | Myron Isaacson | 507-228-8270 | Cell-507-276-6073 |
| **Council Members** | Deb Webster | 507-228-8689 | 507-359-2026 |
| **Response Coordinator** | Allan E. Fox | 507-543-0077 | Cell-507-276-1707 |
| **Alt. Response Coordinator** | Rick Timm | Cell-507-276-8104 | Cell-507-276-8104 |
| **State Incident Duty Officer** | Minnesota Duty Officer | 800-422-0798 | 800-422-0798 |
| **County Emergency Director** | Denise Wright | 911 | 800-247-5044 |
| **Fire Chief** | Scott VanDeest | Cell-507-276-4425 | Cell-507-276-4425 |
| **Sheriff** | Dave Lang | 911 | 507-931-1570 |
| **Police Chief** | N/A | 911 | 911 |
| **System Operator** | Allan E. Fox | 507-543-0077 | Cell-507-276-1707 |
| **Alt. System Operator** | Rick Timm | Cell-507-276-8104 | Cell-507-276-8104 |
| **School Superintendent** | Andrea Harder | Cell-507-276-5830 | 507-228-8943 |
| **Ambulance** | Brad DeBoer | 911 | Cell-507-276-7316 |
| **Hospital** | New Ulm Medical Center | 507-233-1000 | 507-233-1000 |
| **Doctor or Medical Facility** | New Ulm Medical Center | 507-233-1000 | 507-233-1000 |
| **Power Company** | Xcel Energy | Same | 800-895-1999 |
| **Highway Department** | Nicollet County | 911 | 800-247-5044 |
| **Telephone Company** | Century Tel | Same | 800-824-2877 |
| **Neighboring Water System** | City of Winthrop | | 507-647-5306 |
| **MPCA Groundwater Division** | Byron Adams | 800-422-0798 | 800-367-6792 |
| **MRWA Technical Services** | Dave Neiman | Cell-218-820-0595 | 800-367-6792 |
| **MDH District Engineer** | David Weum | 800-422-0798 | 507-344-2700 |
| **MDH Source Water Protection** | Karen Voz | 800-422-0798 | 320-223-7322 |

2. Critical Response Personnel

**Table G-2**

| Title | Name | Address | Telephone | Response Assignment |
|---|---|---|---|---|
| **Response Coordinator** | Allan E. Fox | 1180 Lafayette Ave. | 507-276-1707 | Response activities, Field operations |
| **Alternate Response Coordinator** | Rick Timm | 1200 Lafayette Ave. | 507-276-8104 | Response activities, Field operations |
| **Water Operator** | Allan E. Fox | 1180 Lafayette Ave. | 507-276-1707 | Response activities, Field operations |
| **Alternate Water Operator** | Rick Timm | 1200 Lafayette Ave. | 507-276-8104 | Field operations |
| **Public Relations** | Steve Langhoff | City of Lafayette | 507-228-8710 | Mayoral duties |
| **Alternate Public Relations** | Deb Webster | City of Lafayette | 507-276-4435 | Press/news releases |
| **Public Health/Medical** | Brad DeBoer | City of Lafayette | 507-276-7316 | EMS/ Medical support |
| **Alternate Public Health/Medical** | Ed Mages | City of Lafayette | 507-276-2976 | EMS/ Medical support |

3. Public Information Plan

a) Public relations center:

Lafayette City Office Building.

Public information center location during emergency:

Lafayette City Office Building.
Alternate site will be designated at time of need.

Times available:

As determined and or scheduled.

b) Information checklist to be conveyed to the public and media:

Name of water system:

Lafayette Water Facility

Contaminant of concern and date:

Date detected and any analytical data supporting concerns

Source of contamination:

Where did it come from and how did it get there.

Public health hazard:

Possible Health effects listed here, list any special precautions for the elderly and children.

Steps the public can take:

Boil order, no consumption, cooking, personnel hygiene.

Steps the water system is taking:

Actively testing, water main flushing, work activities and schedule.

Other information:

c) Media contacts

| Media | Name | Telephone | Address |
|---|---|---|---|
| **Newspaper--Primary** | Lafayette-Nicollet Ledger | 507-228-8985 | Lafayette, MN. |
| **Newspaper--Secondary** | The Journal | 507-359-2911 | New Ulm, MN. |
| **Television** | KEYC-12 | 507-625-7905 | North Mankato, MN. |
| **Radio** | KNUJ | 507-354-2921 | New Ulm, MN. |
| **Public Access** | City of Lafayette | 507-228-8241 | Lafayette, MN. |

## H. MITIGATION AND CONSERVATION PLAN

1. Mitigation

a. Infrastructure maintenance/upgrades/maps:

Maintenance on the facilities infrastructure is conducted as follows;
Hydrants are flushed twice a year along with maintenance.
Valve boxes are flushed, and valves are exercised.
Water Mains have been replaced and looped were they have fit in with other projects through out the city.
Upgrades have been focused on eliminating dead ends within the city.
Maps are located at the city bldg. They are stored in a blue print cabinet located adjacent to the conference room.
There are also copies being made of a "working map" that shows all locations of water lines, valves sizes of pipe etc. These maps will be located at the city building, fire station, and water facility and in the cities safe.

b. Regular inspection of tower, well(s), pump house:

Water tower inspections are done twice a year. Hatches and screens are checked for serviceability. The water facility is inspected every day to insure proper operation, and to check for any mechanical failures. Daily readings of the facility flows to the system are recorded, along with well readings. Well levels are checked once a month. Water tower grounds are checked daily also.

c. Staff emergency training:

The city staff has handled some emergencies in the past and has done some training for power outages, spill response, power lines being down and other activities.

d. System security analysis:

The Water Facility is kept locked at all times unless an operator is on site. The Water tower is checked daily to ensure security.

System valving to isolate problems:

Throughout the distribution system are numerous valves that allow us to isolate certain problems. Most are located at intersecting streets, which make locating them fairly easy. The curbs by the valves have been painted red for greater visibility. They are also shown on the "working map".

e. Sanitation procedures for construction/repairs:

Sanitation procedures for new or replacement water mains will be to hold 50 ppm of chlorine residue for 24hrs and pump to waste before the line can be put into service. This usually accomplished by taking chlorine readings of the line from a fire hydrant. During repairs when chlorine cannot be added to the main, the line is isolated and flushed after repairs until consistent chlorine residue is reached.

2. Conservation

a. Water meters:

Water meters have been installed on all service lines to avoid unnecessary use of water and to collect the appropriate billing. The meters are read every month to insure proper operation, and are attended to quickly when a problem arises.

b. Public education:

The public is informed of any changes through our regular council meetings and a quarterly bulletin put out by the city staff. General and utility information is included in this bulletin and mailed to utility customers along with their bill.

c. Rate structure:

The city of Lafayette has adopted a rate that increases as water use increases. There is a utility committee that consists of elected officials, general public and the utility superintendent that advises the council on any changes that may be needed.

# Appendix IV

## FIGURES & SUPPORTING DOCUMENTATION

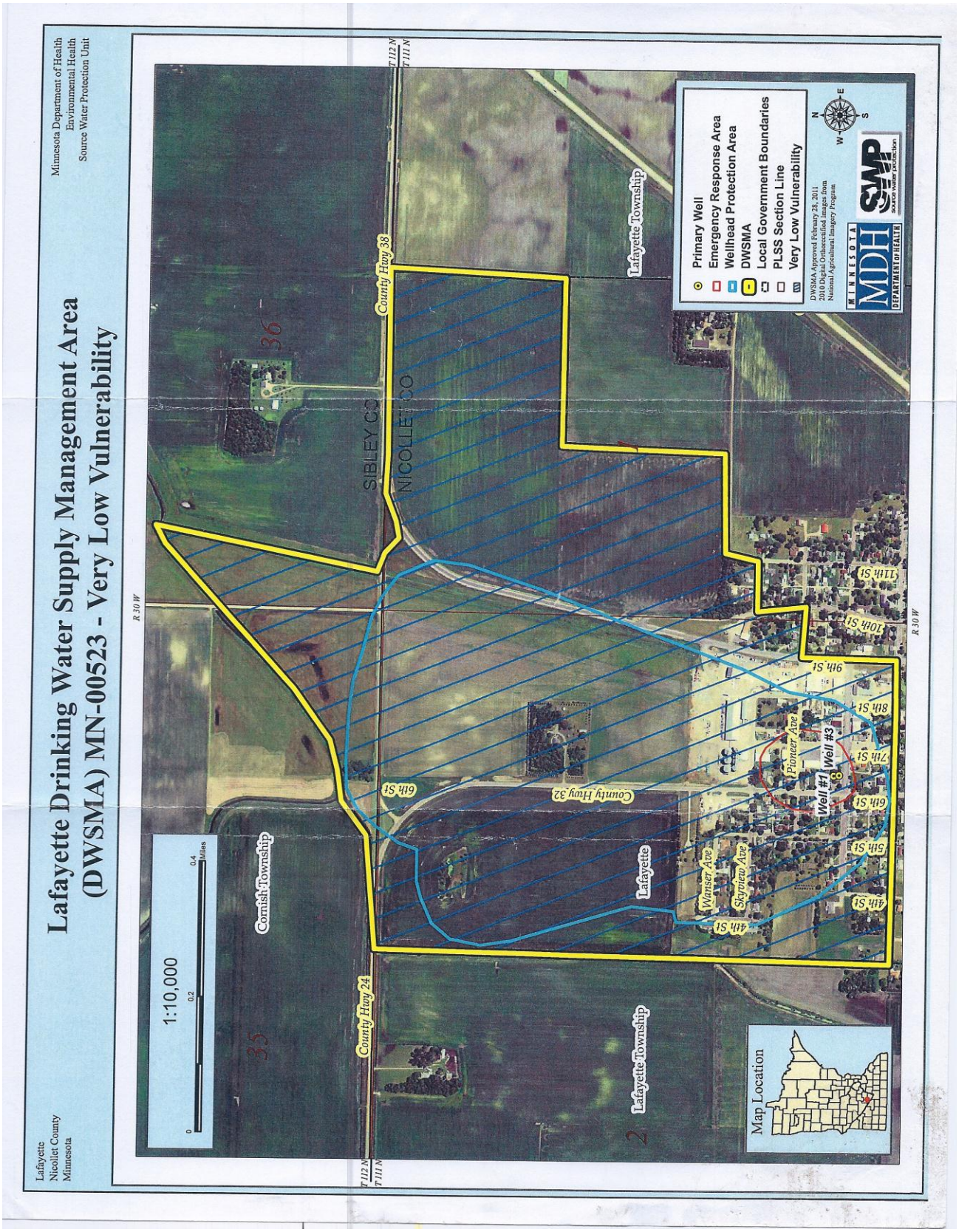


**FIGURE 1 – DRINKING WATER SUPPLY MANAGEMENT AREA & VULNERABILITY**


**FIGURE 2 – PARCEL MAP**

THE CITY OF LAFAYETTE HAS NO LAND USE MAP.
PLEASE REFER TO THE FOLLOWING PAGE, ZONING MAP.

**FIGURE 3 – LAND USE MAP**

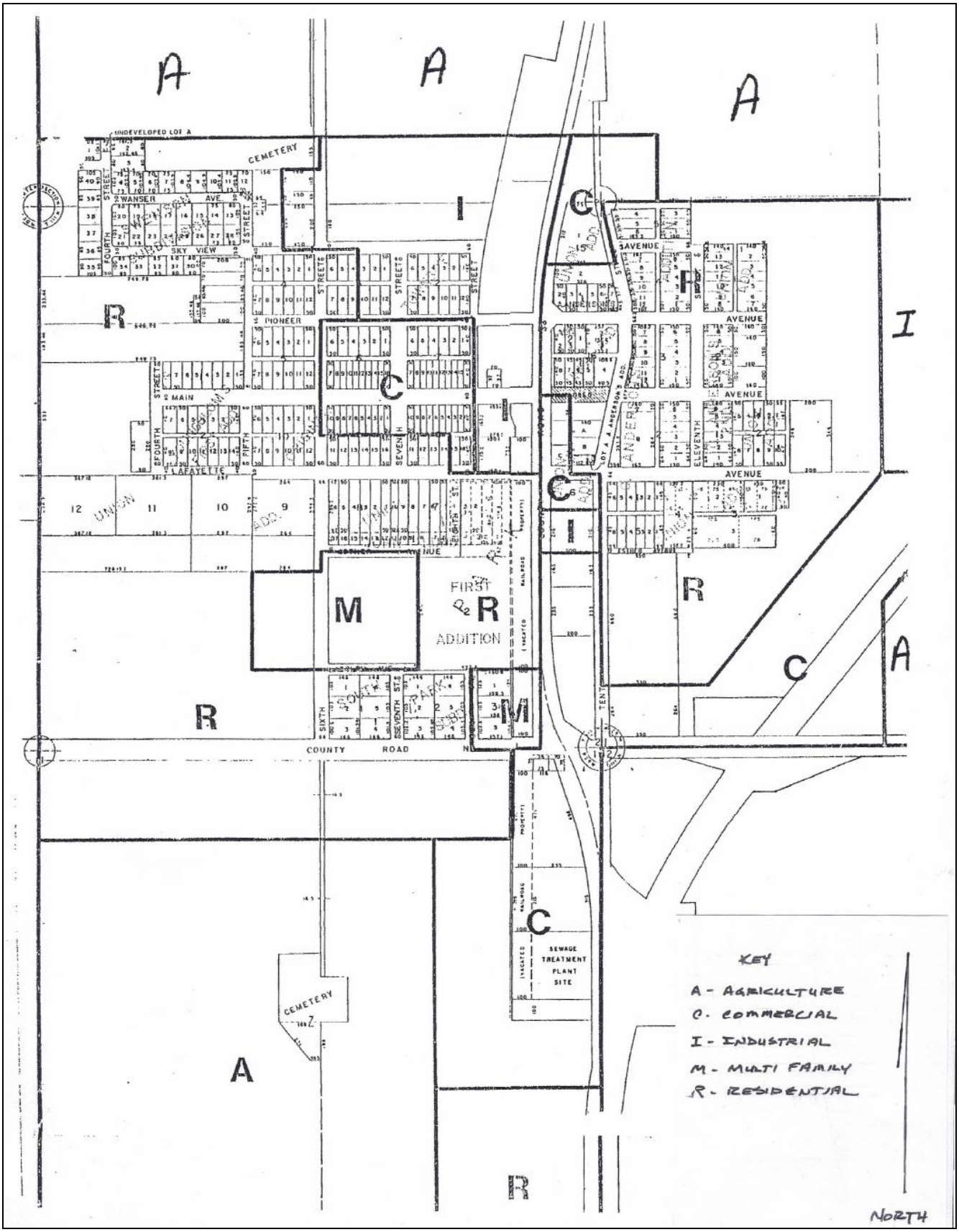


**FIGURE 4 – ZONING MAP**

**FIGURE 5 – INNER WELLHEAD MANAGEMENT ZONE SURVEYS**

Environmental Health Division
Drinking Water Protection Section
P.O. Box 64975
St. Paul, Minnesota 55164-0975

# INNER WELLHEAD MANAGEMENT ZONE (IWMZ) - POTENTIAL CONTAMINANT SOURCE INVENTORY (PCSI) REPORT

## PUBLIC WATER SYSTEM INFORMATION

| | |
|---|---|
| **PWS ID** | 1520002 **COMMUNITY** |
| **NAME** | Lafayette |
| **ADDRESS** | Lafayette Water Superintendent, City Hall, P.O. Box 375, Lafayette, MN 560540375 |

## FACILITY (WELL) INFORMATION

| | |
|---|---|
| **NAME** | Well #1 |
| **FACILITY ID** | S01 |
| **UNIQUE WELL NO.** | 209735 |
| **COUNTY** | Nicollet |

**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**

☐ **YES** (Please attach a copy)
☐ **NO** ☐ **UNDETERMINED**

| **PWS ID / FACILITY ID** | 1520002 S01 | **UNIQUE WELL NO.** | 209735 |
|---|---|---|---|

| PCSI CODE | ACTUAL OR POTENTIAL CONTAMINATION SOURCE | ISOLATION DISTANCES (FEET) | | | | LOCATION | |
|---|---|---|---|---|---|---|---|
| | | Minimum Distances | | Sensitive Well[1] | Within 200 Ft. Y / N / U | Dist. from Well | Est. (?) |
| | | Community | Non-community | | | | |
| **Agricultural Related** | | | | | | | |
| *AC1 | Agricultural chemical buried piping | 50 | 50 | | N | | |
| *AC2 | Agricultural chemical multiple tanks or containers for residential retail sale or use, no single tank or container exceeding, but aggregate volume exceeding 56 gal. or 100 lbs. dry weight | 50 | 50 | | N | | |
| ACP | Agricultural chemical tank or container with 25 gal. or more or 100 lbs. or more dry weight, or equipment filling or cleaning area without safeguards | 150 | 150 | | N | | |
| ACS | Agricultural chemical storage or equipment filling or cleaning area with safeguards | 100 | 100 | | N | | |
| ACR | Agricultural chemical storage or equipment filling or cleaning area with safeguards and roofed | 50 | 50 | | N | | |
| ADW | Agricultural drainage well[2] (Class V well - illegal[3]) | 50 | 50 | | N | | |
| AAT | Anhydrous ammonia tank (stationary tank) | 50 | 50 | | N | | |
| AB1 | Animal building, feedlot, confinement area, or kennel, 0.1 to 1.0 animal unit (stockyard) | 50 | 20 | 100/40 | N | | |
| AB2 | Animal building or poultry building, including a horse riding area, more than 1.0 animal unit | 50 | 50 | 100 | N | | |
| ABS | Animal burial area, more than 1.0 animal unit | 50 | 50 | | N | | |
| FWP | Animal feeding or watering area within a pasture, more than 1.0 animal unit | 50 | 50 | 100 | N | | |
| AF1 | Animal feedlot, unroofed, 300 or more animal units (stockyard) | 100 | 100 | 200 | N | | |
| AF2 | Animal feedlot, more than 1.0, but less than 300 animal units (stockyard) | 50 | 50 | 100 | N | | |
| AMA | Animal manure application | use discretion | use discretion | | N | | |
| REN | Animal rendering plant | 50 | 50 | | N | | |
| MS1 | Manure (liquid) storage basin or lagoon, unpermitted or noncertified | 300 | 300 | 600 | N | | |
| MS2 | Manure (liquid) storage basin or lagoon, approved earthen liner | 150 | 150 | 300 | N | | |
| MS3 | Manure (liquid) storage basin or lagoon, approved concrete or composite liner | 100 | 100 | 200 | N | | |
| MS4 | Manure (solid) storage area, not covered with a roof | 100 | 100 | 200 | N | | |
| OSC | Open storage for crops | use discretion | use discretion | | N | | |
| **SSTS Related** | | | | | | | |
| AA1 | Absorption area of a soil dispersal system, average flow greater than 10,000 gal./day | 300 | 300 | 600 | N | | |
| AA2 | Absorption area of a soil dispersal system serving a facility handling infectious or pathological wastes, average flow 10,000 gal./day or less | 150 | 150 | 300 | N | | |
| AA3 | Absorption area of a soil dispersal system, average flow 10,000 gal./day or less | 50 | 50 | 100 | N | | |
| AA4 | Absorption area of a soil dispersal system serving multiple family residences or a non-residential facility and has the capacity to serve 20 or more persons per day (Class V well)[2] | 50/300/150[4] | 50/300/150[4] | 100/600/300[4] | N | | |
| CSP | Cesspool | 75 | 75 | 150 | N | | |
| AGG | Dry well, leaching pit, seepage pit | 75 | 75 | 150 | N | | |
| *FD1 | Floor drain, grate, or trough connected to a buried sewer | 50 | 50 | | N | | |
| *FD2 | Floor drain, grate, or trough if buried sewer is air-tested, approved materials, serving one building, or two or less single-family residences | 50 | 20 | | N | | |
| *GW1 | Gray-water dispersal area | 50 | 50 | 100 | N | | |
| LC1 | Large capacity cesspools (Class V well - illegal)[2] | 75 | 75 | 150 | N | | |

| PWS ID / FACILITY ID | 1520002 S01 | UNIQUE WELL NO. | 209735 |
|---|---|---|---|

| PCSI CODE | ACTUAL OR POTENTIAL CONTAMINATION SOURCE | ISOLATION DISTANCES (FEET) | | | | LOCATION | |
|---|---|---|---|---|---|---|---|
| | | Minimum Distances | | Sensitive Well[1] | Within 200 Ft. Y / N / U | Dist. from Well | Est. (?) |
| | | Community | Non-community | | | | |
| MVW | Motor vehicle waste disposal (Class V well - illegal)[2] | illegal | illegal | | N | | |
| PR1 | Privy, nonportable | 50 | 50 | 100 | N | | |
| PR2 | Portable (privy) or toilet | 50 | 20 | | N | | |
| *SF1 | Watertight sand filter; peat filter; or constructed wetland | 50 | 50 | | N | | |
| SET | Septic tank | 50 | 50 | | N | | |
| HTK | Sewage holding tank, watertight | 50 | 50 | | N | | |
| SS1 | Sewage sump capacity 100 gal. or more | 50 | 50 | | N | | |
| SS2 | Sewage sump capacity less than 100 gal., tested, conforming to rule | 50 | 20 | | N | | |
| *ST1 | Sewage treatment device, watertight | 50 | 50 | | N | | |
| SB1 | Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences | 50 | 20 | | N | | |
| SB2 | Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials | 50 | 50 | | N | | |
| *WB1 | Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection | 50 | 50 | | N | | |
| *WB2 | Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection | 20 | 20 | | N | | |
| **Land Application** | | | | | | | |
| SPT | Land spreading area for sewage, septage, or sludge | 50 | 50 | 100 | N | | |
| **Solid Waste Related** | | | | | | | |
| COS | Commercial compost site | 50 | 50 | | N | | |
| CD1 | Construction or demolition debris disposal area | 50 | 50 | 100 | N | | |
| *HW1 | Household solid waste disposal area, single residence | 50 | 50 | 100 | N | | |
| LF1 | Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons | 300 | 300 | 600 | N | | |
| SVY | Scrap yard | 50 | 50 | | N | | |
| SWT | Solid waste transfer station | 50 | 50 | | N | | |
| **Storm Water Related** | | | | | | | |
| SD1 | Storm water drain pipe, 8 inches or greater in diameter | 50 | 20 | | N | | |
| SWI | Storm water drainage well[2] (Class V well - illegal[3]) | 50 | 50 | | N | | |
| SM1 | Storm water pond greater than 5000 gal. | 50 | 35 | | N | | |
| **Wells and Borings** | | | | | | | |
| *EB1 | Elevator boring, not conforming to rule | 50 | 50 | | N | | |
| *EB2 | Elevator boring, conforming to rule | 20 | 20 | | N | | |
| MON | Monitoring well | record dist. | record dist. | | N | | |
| WEL | Operating well | record dist. | record dist. | | Y | 43 | |
| UUW | Unused, unsealed well or boring | 50 | 50 | | N | | |
| **General** | | | | | | | |
| *CR1 | Cistern or reservoir, buried, nonpressurized water supply | 20 | 20 | | N | | |
| PLM | Contaminant plume | 50 | 50 | | N | | |
| *CW1 | Cooling water pond, industrial | 50 | 50 | 100 | N | | |
| DC1 | Deicing chemicals, bulk road | 50 | 50 | 100 | N | | |
| *ET1 | Electrical transformer storage area, oil-filled | 50 | 50 | | N | | |
| GRV | Grave or mausoleum | 50 | 50 | | N | | |
| GP1 | Gravel pocket or French drain for clear water drainage only | 20 | 20 | | N | | |
| *HS1 | Hazardous substance buried piping | 50 | 50 | | N | | |
| HS2 | Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards | 150 | 150 | | N | | |
| HS3 | Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards | 100 | 100 | | N | | |
| HS4 | Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding | 50 | 50 | | N | | |
| HWF | Highest water or flood level | 50 | N/A | | N | | |
| *HG1 | Horizontal ground source closed loop heat exchanger buried piping | 50 | 50 | | N | | |
| *HG2 | Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid | 50 | 10 | | N | | |
| IWD | Industrial waste disposal well (Class V well)[2] | illegal[3] | illegal[3] | | N | | |
| IWS | Interceptor, including a flammable waste or sediment | 50 | 50 | | N | | |
| OH1 | Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more) | 50 | 35 | | N | | |

| PWS ID / FACILITY ID | 1520002 S01 | UNIQUE WELL NO. | 209735 |
|---|---|---|---|

| PCSI CODE | ACTUAL OR POTENTIAL CONTAMINATION SOURCE | ISOLATION DISTANCES (FEET) | | | | LOCATION | |
|---|---|---|---|---|---|---|---|
| | | Minimum Distances | | Sensitive Well[1] | Within 200 Ft. Y / N / U | Dist. from Well | Est. (?) |
| | | Community | Non-community | | | | |
| *PP1 | Petroleum buried piping | 50 | 50 | | N | | |
| *PP2 | Petroleum or crude oil pipeline to a refinery or distribution center | 100 | 100 | | N | | |
| PT1 | Petroleum tank or container, 1100 gal. or more, without safeguards | 150 | 150 | | N | | |
| PT2 | Petroleum tank or container, 1100 gal. or more, with safeguards | 100 | 100 | | N | | |
| PT3 | Petroleum tank or container, buried, between 56 and 1100 gal. | 50 | 50 | | N | | |
| PT4 | Petroleum tank or container, not buried, between 56 and 1100 gal. | 50[5] | 20 | | N | | |
| PU1 | Pit or unfilled space more than four feet in depth | 20 | 20 | | N | | |
| PC1 | Pollutant or contaminant that may drain into the soil | 50 | 50 | 100 | N | | |
| SP1 | Swimming pool, in-ground | 20 | 20 | | N | | |
| *VH1 | Vertical heat exchanger, horizontal piping conforming to rule | 50 | 10 | | N | | |
| *VH2 | Vertical heat exchanger (vertical) piping, conforming to rule | 50 | 35 | | N | | |
| *WR1 | Wastewater rapid infiltration basin, municipal or industrial | 300 | 300 | 600 | N | | |
| *WA1 | Wastewater spray irrigation area, municipal or industrial | 150 | 150 | 300 | N | | |
| *WS1 | Wastewater stabilization pond, industrial | 150 | 150 | 300 | N | | |
| *WS2 | Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage | 300 | 300 | 600 | N | | |
| *WS3 | Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage | 150 | 150 | 300 | N | | |
| *WT1 | Wastewater treatment unit tanks, vessels and components (Package plant) | 100 | 100 | | N | | |
| *WT2 | Water treatment backwash disposal area | 50 | 50 | 100 | N | | |
| **Additional Sources (If there is more than one source listed above, please indicate here).** | | | | | | | |
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| **Potential Contamination Sources and Codes Based on Previous Versions of this Form** | | | | | | | |
| | none found within 200' of this well. | | | | | | |

* New potential contaminant source.

[1] A sensitive well has less than 50 feet of watertight casing, and which is not cased below a confining layer or confining materials of at least 10' in thickness.

[2] These sources, known as Class V underground injection wells, are regulated by the federal U.S. Environmental Protection Agency.

[3] These sources are classified as illegal by Minnesota Rules, Chapter 4725.

[4] Isolation distance is determined by average flow per day or if a facility handles infectious or pathological wastes.

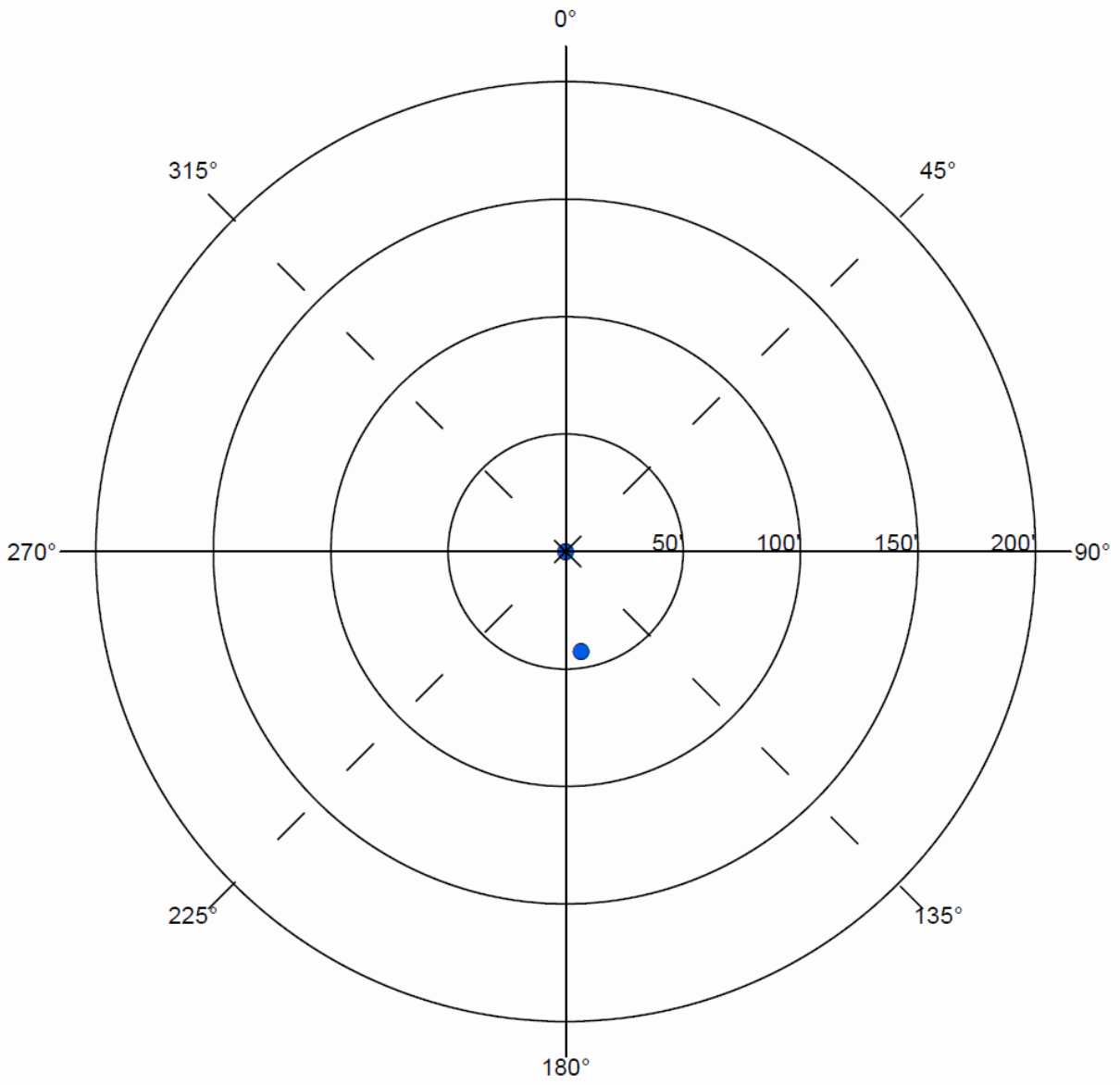
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; or is protected with secondary containment.

This form is based on the new isolation distances in Minnesota Rules, Chapter 4725, related to wells and borings adopted August 4, 2008, and Minnesota Rules, Chapter 4720, related to wellhead protection.

| PWS ID / FACILITY ID | 1520002 S01 | UNIQUE WELL NO. | 209735 |
|---|---|---|---|

| SETBACK DISTANCES | All potential contaminant sources must be noted on sketch. |
|---|---|

Record the distance and approximate compass bearing of each potential contaminant source from the well, and identify the source using the "Source Code". Unlabeled points on the map are unsealed wells.




| | | | |
|---|---|---|---|
| Were the isolation distances maintained for the new sources of contamination? | Y | N | N/A |
| Is the system monitoring existing nonconforming sources of contamination? | (Y) | N | N/A |

| Reminder Question: Were the wellhead protection measure(s) implemented? |
|---|

| INSPECTOR | Neiman, Dave | DATE | 9 - 28 - 2011 |
|---|---|---|---|

| PWS ID / FACILITY ID | 1520002 S01 | UNIQUE WELL NO. | 209735 |
|---|---|---|---|

| RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES | WHP MEASURE IMPLEMENTED? Y or N | DATE VERIFIED |
|---|---|---|
| | | |
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**COMMENTS**

9/7/2003 - Location for PCSI Type PSP (bearing = 0, distance = 200 , inventory date: 7/1/1996 ) could not be determined.
9/7/2003 - Location for PCSI Type PIT (bearing = 0, distance = 45 , inventory date: 7/1/1996 ) could not be determined.
9/7/2003 - Location for PCSI Type PLE (bearing = 0, distance = 7 , inventory date: 7/1/1996 ) could not be determined.

**For further information, please contact:**

**Minnesota Department of Health**
**Drinking Water Protection Section**
**Source Water Protection Unit**
**P.O. Box 64975**
**St. Paul, Minnesota 55164-0975**

**Section Receptionist: 651-201-4700**
**Division TDD: 651-201-5797 or MN Relay Service @ 1-800-627-3529 and ask for 651-201-5000**

Environmental Health Division
Drinking Water Protection Section
P.O. Box 64975
St. Paul, Minnesota 55164-0975

# INNER WELLHEAD MANAGEMENT ZONE (IWMZ) - POTENTIAL CONTAMINANT SOURCE INVENTORY (PCSI) REPORT

## PUBLIC WATER SYSTEM INFORMATION

| | | |
|---|---|---|
| **PWS ID** | 1520002 | **COMMUNITY** |
| **NAME** | Lafayette | |
| **ADDRESS** | Lafayette Water Superintendent, City Hall, P.O. Box 375, Lafayette, MN 560540375 | |

## FACILITY (WELL) INFORMATION

| | |
|---|---|
| **NAME** | Well #3 |
| **FACILITY ID** | S02 |
| **UNIQUE WELL NO.** | 232489 |
| **COUNTY** | Nicollet |

**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**

☐ **YES** (Please attach a copy)
☐ **NO** ☐ **UNDETERMINED**

| **PWS ID / FACILITY ID** | 1520002 S02 | **UNIQUE WELL NO.** | 232489 |
|---|---|---|---|

| PCSI CODE | ACTUAL OR POTENTIAL CONTAMINATION SOURCE | ISOLATION DISTANCES (FEET) | | | | LOCATION | |
|---|---|---|---|---|---|---|---|
| | | Minimum Distances | | Sensitive Well[1] | Within 200 Ft. Y / N / U | Dist. from Well | Est. (?) |
| | | Community | Non-community | | | | |
| **Agricultural Related** | | | | | | | |
| *AC1 | Agricultural chemical buried piping | 50 | 50 | | N | | |
| *AC2 | Agricultural chemical multiple tanks or containers for residential retail sale or use, no single tank or container exceeding, but aggregate volume exceeding 56 gal. or 100 lbs. dry weight | 50 | 50 | | N | | |
| ACP | Agricultural chemical tank or container with 25 gal. or more or 100 lbs. or more dry weight, or equipment filling or cleaning area without safeguards | 150 | 150 | | N | | |
| ACS | Agricultural chemical storage or equipment filling or cleaning area with safeguards | 100 | 100 | | N | | |
| ACR | Agricultural chemical storage or equipment filling or cleaning area with safeguards and roofed | 50 | 50 | | N | | |
| ADW | Agricultural drainage well[2] (Class V well - illegal[3]) | 50 | 50 | | N | | |
| AAT | Anhydrous ammonia tank (stationary tank) | 50 | 50 | | N | | |
| AB1 | Animal building, feedlot, confinement area, or kennel, 0.1 to 1.0 animal unit (stockyard) | 50 | 20 | 100/40 | N | | |
| AB2 | Animal building or poultry building, including a horse riding area, more than 1.0 animal unit | 50 | 50 | 100 | N | | |
| ABS | Animal burial area, more than 1.0 animal unit | 50 | 50 | | N | | |
| FWP | Animal feeding or watering area within a pasture, more than 1.0 animal unit | 50 | 50 | 100 | N | | |
| AF1 | Animal feedlot, unroofed, 300 or more animal units (stockyard) | 100 | 100 | 200 | N | | |
| AF2 | Animal feedlot, more than 1.0, but less than 300 animal units (stockyard) | 50 | 50 | 100 | N | | |
| AMA | Animal manure application | use discretion | use discretion | | N | | |
| REN | Animal rendering plant | 50 | 50 | | N | | |
| MS1 | Manure (liquid) storage basin or lagoon, unpermitted or noncertified | 300 | 300 | 600 | N | | |
| MS2 | Manure (liquid) storage basin or lagoon, approved earthen liner | 150 | 150 | 300 | N | | |
| MS3 | Manure (liquid) storage basin or lagoon, approved concrete or composite liner | 100 | 100 | 200 | N | | |
| MS4 | Manure (solid) storage area, not covered with a roof | 100 | 100 | 200 | N | | |
| OSC | Open storage for crops | use discretion | use discretion | | N | | |
| **SSTS Related** | | | | | | | |
| AA1 | Absorption area of a soil dispersal system, average flow greater than 10,000 gal./day | 300 | 300 | 600 | N | | |
| AA2 | Absorption area of a soil dispersal system serving a facility handling infectious or pathological wastes, average flow 10,000 gal./day or less | 150 | 150 | 300 | N | | |
| AA3 | Absorption area of a soil dispersal system, average flow 10,000 gal./day or less | 50 | 50 | 100 | N | | |
| AA4 | Absorption area of a soil dispersal system serving multiple family residences or a non-residential facility and has the capacity to serve 20 or more persons per day (Class V well)[2] | 50/300/150[4] | 50/300/150[4] | 100/600/300[4] | N | | |
| CSP | Cesspool | 75 | 75 | 150 | N | | |
| AGG | Dry well, leaching pit, seepage pit | 75 | 75 | 150 | N | | |
| *FD1 | Floor drain, grate, or trough connected to a buried sewer | 50 | 50 | | N | | |
| *FD2 | Floor drain, grate, or trough if buried sewer is air-tested, approved materials, serving one building, or two or less single-family residences | 50 | 20 | | N | | |
| *GW1 | Gray-water dispersal area | 50 | 50 | 100 | N | | |
| LC1 | Large capacity cesspools (Class V well - illegal)[2] | 75 | 75 | 150 | N | | |

| PWS ID / FACILITY ID | 1520002 S02 | UNIQUE WELL NO. | 232489 |
|---|---|---|---|

| PCSI CODE | ACTUAL OR POTENTIAL CONTAMINATION SOURCE | ISOLATION DISTANCES (FEET) | | | | LOCATION | |
|---|---|---|---|---|---|---|---|
| | | Minimum Distances | | Sensitive Well[1] | Within 200 Ft. Y / N / U | Dist. from Well | Est. (?) |
| | | Community | Non-community | | | | |
| MVW | Motor vehicle waste disposal (Class V well - illegal)[2] | illegal | illegal | | N | | |
| PR1 | Privy, nonportable | 50 | 50 | 100 | N | | |
| PR2 | Portable (privy) or toilet | 50 | 20 | | N | | |
| *SF1 | Watertight sand filter; peat filter; or constructed wetland | 50 | 50 | | N | | |
| SET | Septic tank | 50 | 50 | | N | | |
| HTK | Sewage holding tank, watertight | 50 | 50 | | N | | |
| SS1 | Sewage sump capacity 100 gal. or more | 50 | 50 | | N | | |
| SS2 | Sewage sump capacity less than 100 gal., tested, conforming to rule | 50 | 20 | | N | | |
| *ST1 | Sewage treatment device, watertight | 50 | 50 | | N | | |
| SB1 | Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences | 50 | 20 | | N | | |
| SB2 | Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials | 50 | 50 | | N | | |
| *WB1 | Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection | 50 | 50 | | N | | |
| *WB2 | Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection | 20 | 20 | | N | | |
| **Land Application** | | | | | | | |
| SPT | Land spreading area for sewage, septage, or sludge | 50 | 50 | 100 | N | | |
| **Solid Waste Related** | | | | | | | |
| COS | Commercial compost site | 50 | 50 | | N | | |
| CD1 | Construction or demolition debris disposal area | 50 | 50 | 100 | N | | |
| *HW1 | Household solid waste disposal area, single residence | 50 | 50 | 100 | N | | |
| LF1 | Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons | 300 | 300 | 600 | N | | |
| SVY | Scrap yard | 50 | 50 | | N | | |
| SWT | Solid waste transfer station | 50 | 50 | | N | | |
| **Storm Water Related** | | | | | | | |
| SD1 | Storm water drain pipe, 8 inches or greater in diameter | 50 | 20 | | N | | |
| SWI | Storm water drainage well[2] (Class V well - illegal[3]) | 50 | 50 | | N | | |
| SM1 | Storm water pond greater than 5000 gal. | 50 | 35 | | N | | |
| **Wells and Borings** | | | | | | | |
| *EB1 | Elevator boring, not conforming to rule | 50 | 50 | | N | | |
| *EB2 | Elevator boring, conforming to rule | 20 | 20 | | N | | |
| MON | Monitoring well | record dist. | record dist. | | N | | |
| WEL | Operating well | record dist. | record dist. | | Y | 43 | |
| UUW | Unused, unsealed well or boring | 50 | 50 | | N | | |
| **General** | | | | | | | |
| *CR1 | Cistern or reservoir, buried, nonpressurized water supply | 20 | 20 | | N | | |
| PLM | Contaminant plume | 50 | 50 | | N | | |
| *CW1 | Cooling water pond, industrial | 50 | 50 | 100 | N | | |
| DC1 | Deicing chemicals, bulk road | 50 | 50 | 100 | N | | |
| *ET1 | Electrical transformer storage area, oil-filled | 50 | 50 | | N | | |
| GRV | Grave or mausoleum | 50 | 50 | | N | | |
| GP1 | Gravel pocket or French drain for clear water drainage only | 20 | 20 | | N | | |
| *HS1 | Hazardous substance buried piping | 50 | 50 | | N | | |
| HS2 | Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight, without safeguards | 150 | 150 | | N | | |
| HS3 | Hazardous substance tank or container, above ground or underground, 56 gal. or more, or 100 lbs. or more dry weight with safeguards | 100 | 100 | | N | | |
| HS4 | Hazardous substance multiple storage tanks or containers for residential retail sale or use, no single tank or container exceeding 56 gal. or 100 lbs., but aggregate volume exceeding | 50 | 50 | | N | | |
| HWF | Highest water or flood level | 50 | N/A | | N | | |
| *HG1 | Horizontal ground source closed loop heat exchanger buried piping | 50 | 50 | | N | | |
| *HG2 | Horizontal ground source closed loop heat exchanger buried piping and horizontal piping, approved materials and heat transfer fluid | 50 | 10 | | N | | |
| IWD | Industrial waste disposal well (Class V well)[2] | illegal[3] | illegal[3] | | N | | |
| IWS | Interceptor, including a flammable waste or sediment | 50 | 50 | | N | | |
| OH1 | Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more) | 50 | 35 | | N | | |

| PWS ID / FACILITY ID | 1520002 S02 | UNIQUE WELL NO. | 232489 |
|---|---|---|---|

| PCSI CODE | ACTUAL OR POTENTIAL CONTAMINATION SOURCE | ISOLATION DISTANCES (FEET) | | | | LOCATION | |
|---|---|---|---|---|---|---|---|
| | | Minimum Distances | | Sensitive Well[1] | Within 200 Ft. Y / N / U | Dist. from Well | Est. (?) |
| | | Community | Non-community | | | | |
| *PP1 | Petroleum buried piping | 50 | 50 | | N | | |
| *PP2 | Petroleum or crude oil pipeline to a refinery or distribution center | 100 | 100 | | N | | |
| PT1 | Petroleum tank or container, 1100 gal. or more, without safeguards | 150 | 150 | | N | | |
| PT2 | Petroleum tank or container, 1100 gal. or more, with safeguards | 100 | 100 | | N | | |
| PT3 | Petroleum tank or container, buried, between 56 and 1100 gal. | 50 | 50 | | N | | |
| PT4 | Petroleum tank or container, not buried, between 56 and 1100 gal. | 50[5] | 20 | | N | | |
| PU1 | Pit or unfilled space more than four feet in depth | 20 | 20 | | N | | |
| PC1 | Pollutant or contaminant that may drain into the soil | 50 | 50 | 100 | N | | |
| SP1 | Swimming pool, in-ground | 20 | 20 | | N | | |
| *VH1 | Vertical heat exchanger, horizontal piping conforming to rule | 50 | 10 | | N | | |
| *VH2 | Vertical heat exchanger (vertical) piping, conforming to rule | 50 | 35 | | N | | |
| *WR1 | Wastewater rapid infiltration basin, municipal or industrial | 300 | 300 | 600 | N | | |
| *WA1 | Wastewater spray irrigation area, municipal or industrial | 150 | 150 | 300 | N | | |
| *WS1 | Wastewater stabilization pond, industrial | 150 | 150 | 300 | N | | |
| *WS2 | Wastewater stabilization pond, municipal, 500 or more gal./acre/day of leakage | 300 | 300 | 600 | N | | |
| *WS3 | Wastewater stabilization pond, municipal, less than 500 gal./acre/day of leakage | 150 | 150 | 300 | N | | |
| *WT1 | Wastewater treatment unit tanks, vessels and components (Package plant) | 100 | 100 | | N | | |
| *WT2 | Water treatment backwash disposal area | 50 | 50 | 100 | N | | |
| **Additional Sources (If there is more than one source listed above, please indicate here).** | | | | | | | |
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| **Potential Contamination Sources and Codes Based on Previous Versions of this Form** | | | | | | | |
| | none found within 200' of this well. | | | | | | |

* New potential contaminant source.

[1] A sensitive well has less than 50 feet of watertight casing, and which is not cased below a confining layer or confining materials of at least 10' in thickness.

[2] These sources, known as Class V underground injection wells, are regulated by the federal U.S. Environmental Protection Agency.

[3] These sources are classified as illegal by Minnesota Rules, Chapter 4725.

[4] Isolation distance is determined by average flow per day or if a facility handles infectious or pathological wastes.

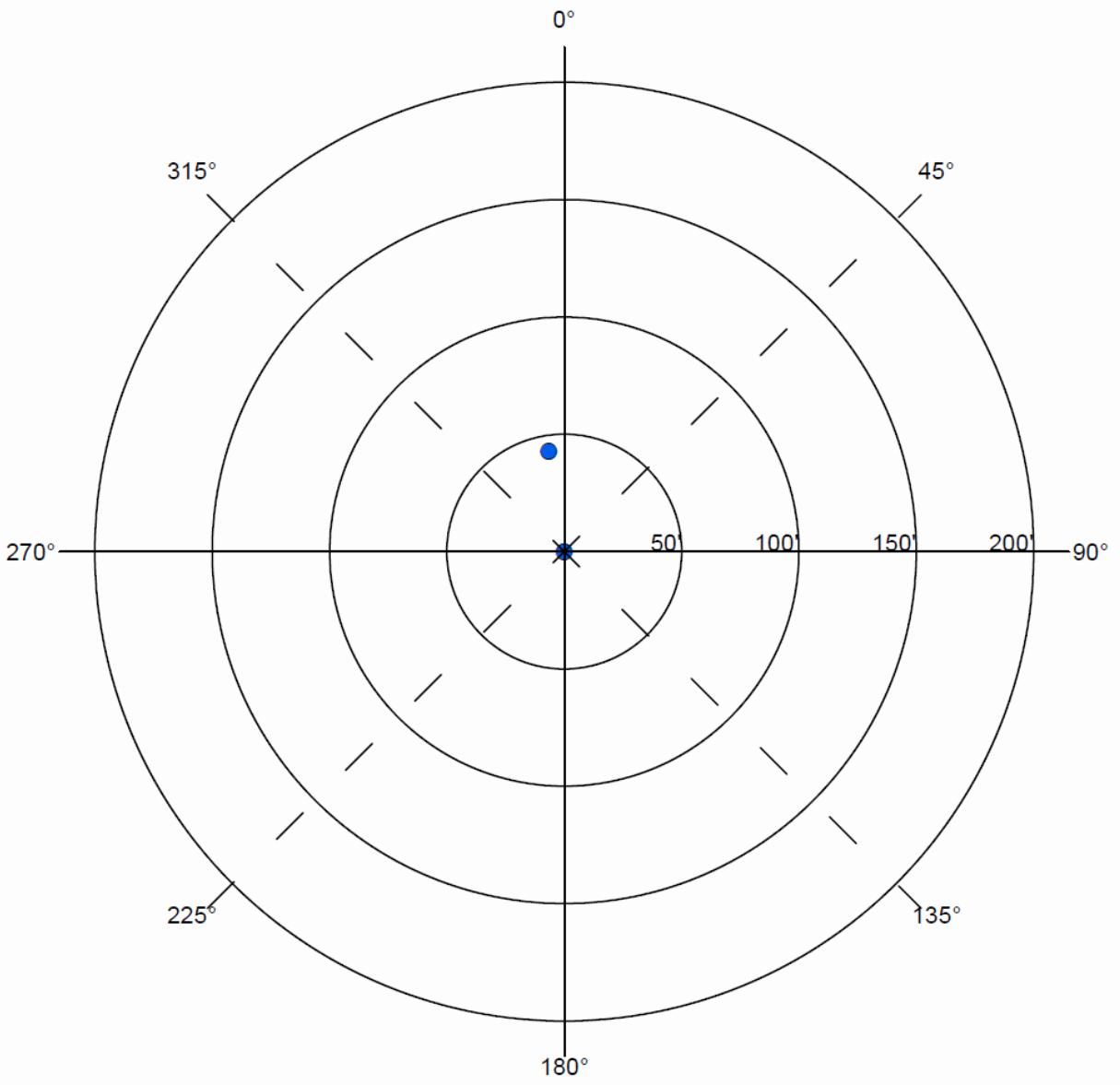
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; or is protected with secondary containment.

This form is based on the new isolation distances in Minnesota Rules, Chapter 4725, related to wells and borings adopted August 4, 2008, and Minnesota Rules, Chapter 4720, related to wellhead protection.

| PWS ID / FACILITY ID | 1520002 S02 | UNIQUE WELL NO. | 232489 |
|---|---|---|---|

| SETBACK DISTANCES | All potential contaminant sources must be noted on sketch. |
|---|---|

Record the distance and approximate compass bearing of each potential contaminant source from the well, and identify the source using the "Source Code". Unlabeled points on the map are unsealed wells.




| | | | |
|---|---|---|---|
| Were the isolation distances maintained for the new sources of contamination? | Y | N | N/A |
| Is the system monitoring existing nonconforming sources of contamination? | (Y) | N | N/A |

**Reminder Question: Were the wellhead protection measure(s) implemented?**

| INSPECTOR | Neiman, Dave | DATE | 9 - 28 - 2011 |
|---|---|---|---|

| PWS ID / FACILITY ID | 1520002 S02 | UNIQUE WELL NO. | 232489 |
|---|---|---|---|

| RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES | WHP MEASURE IMPLEMENTED? Y or N | DATE VERIFIED |
|---|---|---|
| | | |
| | | |
| | | |
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| | | |
| | | |
| | | |
| | | |

**COMMENTS**

9/7/2003 - Location for PCSI Type PSP (bearing = 0, distance = 200 , inventory date: 7/1/1996 ) could not be determined.
9/7/2003 - Location for PCSI Type PIT (bearing = 0, distance = 45 , inventory date: 7/1/1996 ) could not be determined.
9/7/2003 - Location for PCSI Type PLE (bearing = 0, distance = 7 , inventory date: 7/1/1996 ) could not be determined.

**For further information, please contact:**

**Minnesota Department of Health**
**Drinking Water Protection Section**
**Source Water Protection Unit**
**P.O. Box 64975**
**St. Paul, Minnesota 55164-0975**

**Section Receptionist: 651-201-4700**
**Division TDD: 651-201-5797 or MN Relay Service @ 1-800-627-3529 and ask for 651-201-5000**

## FIGURE 6 – SECOND SCOPING DECISION NOTICE

MINNESOTA MDH DEPARTMENT of HEALTH

COPY

*Protecting, maintaining and improving the health of all Minnesotans*

June 10, 2011

Mr. Allan Fox
Utility Supervisor - City of Lafayette
P.O. Box 375
Lafayette, Minnesota 56054-0375

Dear Mr. Fox:

Subject: Second Scoping Decision Notice for the City of Lafayette, PWSID 1520002

This letter provides notice of the results of a scoping meeting held with you, Dave Neiman (Minnesota Rural Water Association) and me (Minnesota Department of Health) on June 7, 2011, regarding wellhead protection (WHP) planning. During the meeting we discussed the data elements that must be included and used to prepare the part of the WHP plan related to the management of potential contaminants in the approved drinking water supply management area. The enclosed Scoping 2 Decision Notice lists the data elements that were discussed at the meeting.

The city of Lafayette has met the requirements to distribute copies of the first part of the wellhead protection plan to local units of government and hold an informational meeting for the public. The city of Lafayette will have until March 8, 2012, to complete its wellhead protection plan.

If a data element is marked on the enclosed notice as a data element that must be used and it does not exist, it is helpful if your plan notes this. Dave Neiman, of Minnesota Rural Water Association, will be working with you to develop a draft of the remainder of the wellhead protection plan. I will be contacting you to review the progress of the development of Part II of your plan. If you have any questions regarding the enclosed notice, contact me by email at karen.s.voz@state.mn.us or by phone at 320/223-7322.

Sincerely,

Karen S. Voz

Karen S. Voz, Principal Planner
Source Water Protection Unit
Environmental Health Division
3333 West Division Street - Suite 212
St. Cloud, Minnesota 56301

KSV:kmc
Enclosures
cc: David Weum, MDH Engineer, Mankato District Office
Byron Adams, Water Monitoring Section, Minnesota Pollution Control Agency
Joe Richter, Division of Waters, Minnesota Department of Natural Resources
Brian Williams, Pesticide & Fertilizer Mgmt. Division, Minnesota Department of Agriculture
Eric Mohring, Hydrologist, Board of Water and Soil Resources
Heather McCallum, City Administrator, City of Lafayette

# SCOPING 2 DECISION NOTICE

➢ **Remainder of the Wellhead Protection Plan**

| Name of Public Water Supply: | | Date: |
|---|---|---|
| City of Lafayette PWSID | | June 10, 2011 |
| Name of the Wellhead Protection Manager: | | |
| Mr. Allan Fox, Utility Supervisor | | |
| Address: 700 Ninth Street P.O. Box 375 | City: Lafayette | Zip: 56054-0375 |
| Unique Well Numbers: 209735 (Well 1), 232489 (Well 3) | | Phone: 507/276-1707 |

**Instructions for Completing the Scoping 2 Form**

| N | R | S | |
|---|---|---|---|
| X | | | **N = Not required.** If this box is checked, this data element is **NOT** necessary for your wellhead protection plan because it is not needed or it has been included in the first scoping decision notice. **Please go to the next data element.** |

| N | R | S | |
|---|---|---|---|
| | X | | **R = Required for the remainder of the plan.** If this box is checked, this data **MUST** be used for the **"remainder of the plan."** |

| N | R | S | |
|---|---|---|---|
| | | X | **S = Submit to MDH. If this box is checked, this data element MUST be included in your wellhead protection plan and submitted to MDH.** If there is **NO** check mark in the **"S"** box but there is an "x" in the **"R"** box, this data element **MUST** be included in your plan, but should **NOT be submitted to MDH.** This box will only be checked if MDH does not have access to this data element. This will help to reduce the cost by reducing the amount of paper and time to reproduce the data element. |

Note: Any data elements required in the first scoping decision notice must also be used to complete the remainder of the wellhead protection plan.

## DATA ELEMENTS ABOUT THE PHYSICAL ENVIRONMENT

### PRECIPITATION

| N | R | S | |
|---|---|---|---|
| X | | | An existing map or list of local precipitation gauging stations. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | An existing table showing the average monthly and annual precipitation in inches for the preceding five years. |

**Technical Assistance Comments:**

### GEOLOGY

| N | R | S | |
|---|---|---|---|
| | X | | An existing geologic map and a description of the geology, including aquifers, confining layers, recharge areas, discharge areas, sensitive areas as defined in Minnesota Statutes, section 103H.005, subdivision 13, and groundwater flow characteristics. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

| N | R | S | |
|---|---|---|---|
| | X | | Existing records of the geologic materials penetrated by wells, borings, exploration test holes, or excavations, including those submitted to the department. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

| N | R | S | |
|---|---|---|---|
| | X | | Existing borehole geophysical records from wells, borings, and exploration test holes. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

| N | R | S | |
|---|---|---|---|
| | X | | Existing surface geophysical studies. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

### SOILS

| N | R | S | |
|---|---|---|---|
| X | | | Existing maps of the soils and a description of soil infiltration characteristics. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | A description or an existing map of known eroding lands that are causing sedimentation problems. |

**Technical Assistance Comments:**

| WATER RESOURCES | | | |
|---|---|---|---|
| N | R | S | An existing map of the boundaries and flow directions of major watershed units and minor watershed units. |
| X | | | |
| **Technical Assistance Comments:** | | | |
| N | R | S | An existing map and a list of public waters as defined in Minnesota Statutes, section 103G.005, subdivision 15, and public drainage ditches. |
| X | | | |
| **Technical Assistance Comments:** | | | |
| N | R | S | The shoreland classifications of the public waters listed under subitem (2), pursuant to part 6120.3000 and Minnesota Statutes, sections 103F.201 to 103F.221. |
| X | | | |
| **Technical Assistance Comments:** | | | |
| N | R | S | An existing map of wetlands regulated under chapter 8420 and Minnesota Statutes, section 103G.221 to 103G.2373. |
| X | | | |
| **Technical Assistance Comments:** | | | |
| N | R | S | An existing map showing those areas delineated as floodplain by existing local ordinances. |
| X | | | |
| **Technical Assistance Comments:** | | | |

## DATA ELEMENTS ABOUT THE LAND USE

| LAND USE | | | |
|---|---|---|---|
| N | R | S | An existing map of parcel boundaries. |
| | X | X | |
| **Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element. | | | |
| N | R | S | An existing map of political boundaries. |
| | X | X | |
| **Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element. | | | |
| N | R | S | An existing map of public land surveys including township, range, and section. |
| | X | | |
| **Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element. | | | |

| N | R | S | |
|---|---|---|---|
| | X | X | A map and an inventory of the current and historical agricultural, residential, commercial, industrial, recreational, and institutional land uses and potential contaminant sources. |

**Technical Assistance Comments:** The inventory, mapping, and management of land uses and potential sources of contamination for all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements, as follows:

Low Vulnerability - 1) All potential contaminant sources and facility designations as listed on the attachment, 2) a land use/land cover map and table, and 3) an inventory of the Inner Wellhead Management Zone (IWMZ).

As a starting point, MDH will provide a 1992 or 2001 land cover map and table from federal data bases. This data set must be used unless an alternative electronic data set that is more current and detailed is available.

Management strategies must be developed for all land uses and potential sources of contamination.

| N | R | S | |
|---|---|---|---|
| | X | X | An existing comprehensive land-use map. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element. Include any urban fringe planning areas.

| N | R | S | |
|---|---|---|---|
| | X | X | Existing zoning map. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

## PUBLIC UTILITY SERVICES

| N | R | S | |
|---|---|---|---|
| X | | | An existing map of transportation routes or corridors. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | An existing map of storm sewers, sanitary sewers, and public water supply systems. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | An existing map of the gas and oil pipelines used by gas and oil suppliers. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | An existing map or list of public drainage systems. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| | X | | An existing record of construction, maintenance, and use of the public water supply well(s) and other wells within the drinking water supply management area. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

## DATA ELEMENTS ABOUT WATER QUANTITY

### SURFACE WATER QUANTITY

| N | R | S | |
|---|---|---|---|
| X | | | An existing description of high, mean, and low flows on streams. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | An existing list of lakes where the state has established ordinary high water marks. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | An existing list of permitted withdrawals from lakes and streams, including source, use, and amounts withdrawn. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | An existing list of lakes and streams for which state protected levels or flows have been established. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | An existing description of known water-use conflicts, including those caused by groundwater pumping. |

**Technical Assistance Comments:**

### GROUNDWATER QUANTITY

| N | R | S | |
|---|---|---|---|
| | X | | An existing list of wells covered by state appropriation permits, including amounts of water appropriated, type of use, and aquifer source. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

| N | R | S | |
|---|---|---|---|
| | X | | An existing description of known well interference problems and water use conflicts. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

| N | R | S | |
|---|---|---|---|
| | X | | An existing list of state environmental bore holes, including unique well number, aquifer measured, years of record, and average monthly levels. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

## DATA ELEMENTS ABOUT WATER QUALITY

### SURFACE WATER QUALITY

| N | R | S | |
|---|---|---|---|
| X | | | An existing map or list of the state water quality management classification for each stream and lake. |

**Technical Assistance Comments:**

| N | R | S | |
|---|---|---|---|
| X | | | An existing summary of lake and stream water quality monitoring data, including:<br>1. bacteriological contamination indicators;<br>2. inorganic chemicals;<br>3. organic chemicals;<br>4. sedimentation;<br>5. dissolved oxygen; and<br>6. excessive growth or deficiency of aquatic plants. |

**Technical Assistance Comments:**

### GROUNDWATER QUALITY

| N | R | S | |
|---|---|---|---|
| | X | | An existing summary of water quality data, including: 1. bacteriological contamination indicators; 2. inorganic chemicals; and 3. organic chemicals. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

| N | R | S | |
|---|---|---|---|
| | X | | An existing list of water chemistry and isotopic data from wells, springs, or other groundwater sampling points. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

| N | R | S | |
|---|---|---|---|
| | X | | An existing report of groundwater tracer studies. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

| N | R | S | |
|---|---|---|---|
| | X | | An existing site study and well water analysis of known areas of groundwater contamination. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about these data elements.

| N | R | S | |
|---|---|---|---|
| | X | | An existing property audit identifying contamination. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

| N | R | S | |
|---|---|---|---|
| | X | | An existing report to the Minnesota Department of Agriculture and the Minnesota Pollution Control Agency of contaminant spills and releases. |

**Technical Assistance Comments:** The management of all the Drinking Water Supply Management Area(s) must reflect what is known about this data element.

Nicollet County
MINNESOTA

OFFICE OF ENVIRONMENTAL SERVICES

Serving Citizens Since 1853

January 6, 2012

Mr. Allan E. Fox
City of Lafayette
700 9th St
PO Box 375
Lafayette, MN 56054

RE: Amended Wellhead Protection Plan for the City of Lafayette

Dear Al,

The staff at Nicollet County Environmental Services Department (ESD) have reviewed the Wellhead Protection Program for the City of Lafayette, specifically Table 10 (p.18). After review, ESD is in support of the City's efforts and are willing to assist with implementation measures as described.

In addition, I would like to mention that the Minnesota Board of Water and Soil Resources (BWSR) supplies funding for Well Sealing through their Clean Water Fund Competitive Grant program. Information on this program can be found on BWSR's website at: www.bwsr.state.mn.us/cleanwaterfund/index.html.

We appreciate the opportunity to comment on the Program and look forward to assisting the City of Lafayette in achieving their goals.

Sincerely,

Amy Linneroth
Water Planner

Cc: Bob Podhradsky, Nicollet County Administrator
Dr. Bruce Beatty, Chairperson, Nicollet County Board

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