CITY OF OAKDALE
WELLHEAD PROTECTION PLAN
PART 2 (AMENDMENT)

APRIL 11, 2017

Stantec Project No. 193801820

TABLE OF CONTENTS

FIGURES

APPENDICES

PUBLIC WATER SUPPLY

NAME: City of Oakdale

ADDRESS: 1584 Hadley Avenue North
Oakdale, MN 55128

TELEPHONE NUMBER: (651) 739-5086

WELLHEAD PROTECTION MANAGER

NAME: Brian Bachmeier, Public Works Director/City Engineer

ADDRESS: 1584 Hadley Avenue North
Oakdale, MN 55128

TELEPHONE NUMBER: (651) 730-2730

E-MAIL: brian.bachmeier@ci.oakdale.mn.us FAX No.: (651) 730-2820

CONSULTANT/TECHNICAL ASSISTANCE

NAME: Mark Janovec, Stantec Consulting Services Inc.

ADDRESS: 2335 West Highway 36
St. Paul, MN 55113

TELEPHONE NUMBER: (651) 636-4600

E-MAIL: mark.janovec@stantec.com FAX NUMBER: (651) 636-1311

DOCUMENTATION LIST

STEP	DATE PERFORMED
Part 1 Approval Notice Received from MDH	September 18, 2015
Scoping 2 Meeting Held (4720.5349, subp. 1)	February 5, 2016
Scoping Decision Notice Received (4720.5340, subp. 2)	February 16, 2016
Remaining Portion of Plan Submitted to Local Units of Government (LGUs) (4720.5350, subp. 1 & 2)	January 9, 2017
Review Received From Local Units of Government (4720.5350, subp. 2)	March 24, 2017
Review Considered (4720.5350, subp. 3)	January-March 2017
Public Hearing Conducted (4720.5350, subp. 4)	March 28, 2017
Remaining Portion WHP Plan Submitted (4720.5360, subp. 1)	April 11, 2017
Approved Review Notice Received	

PUBLIC WATER SUPPLY WELL INFORMATION

Well Number	Unique Number	Aquifer	Casing Depth (ft)	Well Depth (ft)	Year Constructed	Well Vulnerability*
Well 1	208462	Jordan	501	581	1958	Vulnerable
Well 2	208463	Jordan	458	542	1964	Vulnerable
Well 3	208454	Jordan	424	510	1969	Vulnerable
Well 5	127287	Jordan	436	520	1978	Vulnerable
Well 7	463534	Jordan	467	563	1990	Vulnerable
Well 8	572608	Jordan	381	463	1996	Vulnerable
Well 9	611059	Jordan	441	517	2001	Vulnerable
Well 10	773389	Jordan	415	501	2010	Vulnerable

*See the Part 1 plan for explanation of well vulnerability.

1.0 INTRODUCTION

Wellhead protection is a means of safeguarding public water supply wells by preventing contaminants from entering the area that contributes water to the well or wellfield over a period of time. This program is now required in Minnesota since the Minnesota Department of Health (MDH) implemented its Wellhead Protection Rules in November 1997. The MDH initiated its Wellhead Protection Program in response to the 1986 Amendments to the Safe Drinking Water Act and MDH's statutory authority is granted in the Minnesota Groundwater Protection Act of 1989. The City of Oakdale completed its initial Part 2 Wellhead Protection Plan in 2004 and adopted wellhead protection planning strategies to protect its public water supply wells. This report is the amended Part 2 Wellhead Protection Plan that replaces the 2004 plan.

The City of Oakdale currently operates eight primary production wells for municipal water supply purposes. All wells are within City limits and are completed in the Jordan Aquifer. A detailed description of the geologic and hydrogeologic setting of Oakdale's water supply system is presented in *City of Oakdale Wellhead Protection Plan Part 1 (Amendment)* (Stantec) which was approved by the MDH in September 2015. (See Appendix G.) The rest of this report is used to summarize the wellhead protection area delineation analysis, the vulnerability assessment, and to present the contents of the wellhead protection management plan.

2.0 WELLHEAD PROTECTION AREA AND DRINKING WATER SUPPLY MANAGEMENT AREA

The wellhead protection area (WHPA) and drinking water supply management area (DWSMA) delineation analyses were conducted in accordance with Minnesota Department of Health's wellhead protection rules. As a result, the following criteria were considered in making the delineation analysis: 1) the aquifer's hydraulic conductivity, 2) the groundwater flow direction, 3) the average daily pumping rate from each of the existing wells, 4) hydrogeologic boundaries, and 5) time of travel.

Each of these criteria were factored into the development of a groundwater flow model that was ultimately used to conduct the delineation analysis. The results of this analysis (i.e., the WHPA and DWSMA) are presented in Figure 1 for both City wells. Additional details on the delineation analysis is presented in *City of Oakdale Wellhead Protection Plan, Part 1 (Amendment)*, prepared by Stantec. See Appendix G. The delineation was approved by the MDH in Septmber 2015.

3.0 VULNERABILITY ASSESSMENT

Two separate assessments were undertaken to determine the vulnerability of the City's water supply. The first assessment consisted of an assessment of the vulnerability to contamination of the Jordan aquifer within the identified DWSMA. This assessment was completed according to MDH guidelines and recommended methodology. The second assessment was a well vulnerability assessment for the City's wells. The well vulnerability assessment was also completed using MDH guidelines. A description of the two assessments is presented in *City of Oakdale Wellhead Protection Plan, Part 1 (Amendment)*, prepared by Stantec (Appendix G). The result of the analysis is that the aquifer in the vicinity of the DWSMA has a "moderate" level of vulnerability.

These vulnerability designations drove the need for a detailed inventory and evaluation of potential contaminant sources, which is presented later in this report.

4.0 DATA ELEMENTS

The State rules relating to wellhead protection require that wellhead protection plans include specific data elements. Each of these elements was discussed specifically in the second scoping meeting with the MDH and are presented briefly here.

4.1 Geology

A complete description of geologic conditions in the wellhead protection area is provided in *City of Oakdale Wellhead Protection Plan, Part 1 (Amendment),* prepared by Stantec (Appendix G), which was approved by the MDH in September 2015 (4720.5400, subp. 1, item B). In general, it was determined that the Prairie du Chien-Jordan aquifer is hydraulically connected to the Mississippi River and the St. Croix River, with the dominant flow direction and gradient being driven by the proximity of both rivers. Confining units are generally limited to areas where the basal layer of the St. Peter sandstone is present, since this layer typically contains a higher content of shale. Glacial drift deposits containing clay can also act as confining units. In the area of the groundwater DWSMA, the St. Peter sandstone is present. Glacial clay deposits are present over a large portion of the DWSMA, but are thin in areas and may not be laterally extensive in all areas. As a result, a "moderate" vulnerability classification was assigned to the DWSMA. This means that while the geologic layers do offer some level of protection to the Jordan aquifer, there is still the possibility that contamination could vertically infiltrate to the bedrock aquifers, given enough time.

4.2 Groundwater Quality

The quality of water from the City's wells is good, with no contaminants detected that violated federal drinking water standards. In 2015, nitrates were found to range between non-detection to a maximum level of 2.5 mg/L. The Maximum Contaminant Level for nitrates is 10.4 mg/L

Perfluorochemicals (PFCs) have been detected over large parts of Southern Washington County and Eastern Dakota County as a result of chemicals believed to have been landfilled by the 3M Company in the area in multiple sites. While PFCs have likely been present in the aquifer(s) in these areas for multiple decades, they were first detected in around 2005, when sampling efforts were undertaken to search for these compounds. This occurred shortly after Oakdale completed its original Wellhead Protection Plan.

In the Oakdale wells, PFBA (Perflourobutanoic Acide, a type of PFC) has been detected in all eight primary water supply wells. Other PFCs, including PFOA (perfluorooctanoic acide), PFOS (perflourooctanesufonate), PFBS (perfluorobutane sulfonate), PFPeA (perfluoropentanoic acid), PFHxS (perfluorohexane sulfonate), and PFHxA (perfluorohexanoic acid), have been detected in one or more Oakdale municipal wells. The following table shows a comparison of the maximum detected concentration of each PFC from the City's wells against the established Health Risk Limit (HRL) for each type of PFC.

PFC Type	Maximum Concentration Detected to Date (ug/L)	Health Risk Limit (ug/L)
PFBA	2.2	7.0
PFOA	0.9	0.3
PFOS	1.4	0.3
PFBS	0.06	7.0
PFPeA	0.1	Not Established
PFHxS	0.1	Not Established
PFHxA	0.4	Not Established

All PFCs detected to date have been under the established Health Risk Limits, with the exception of PFOA and PFOS. Oakdale established a filtration plant in October 2006 to remove PFCs from Wells 5 and 9. The result of filtration is that PFOA and PFOS are reduced to (or below) the current detection limits. In May 2016, the United States Environmental Protection Agency set a lifetime drinking water Health Advisory (HA) for PFOA at 0.07 ug/L. The filtration plant output meets this new standard.

PFC concentrations have been trending downwards in most wells over the past decade, since the source of the contamination has somewhat been reduced or contained. Based on the current science available on the effects of PFCs, it is believed that the current levels in the drinking water distribution system do not pose a significant risk to the population that consumes Oakdale's water. If additional studies indicate that Health Risk Limits need to be lowered, the quality of Oakdale's water supply will need to be re-evaluated at that time. There is little that Oakdale can do to eliminate PFC concentrations in the aquifers at this point, but working with local agencies and 3M to monitor PFC contamination will help ensure that the drinking water continues to meet State and Federal standards.

Annual water sampling is on file with the MDH. The 2015 Drinking Water Report, which summarizes the latest water quality sampling of the City's wells, has been provided in Appendix B of this plan.

4.3 Groundwater Quantity

There are several wells in surrounding areas which are covered by State groundwater appropriation permits. The Part 1 report shows nearby wells and their average volume pumped between 2001 and 2010. Data indicates there are no known well interference problems in or around the Oakdale DWSMA. Information showing all well appropriations permits and volumes pumped can be viewed at the Department of Natural Resources website at **http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/wateruse.html**.

Oakdale is included within the DNR's North and East Metro Groundwater Management Area. This is due to evidence showing that aquifer water levels within this portion of the metropolitan area could reach critical levels once all communities in the area are fully populated. Groundwater levels in Oakdale appear to be less critical than in other portions of the management area, but water conservation will be one step to help ensure that groundwater resources are sustainable for Oakdale's future needs.

5.0 CONTAMINANT SOURCE INVENTORY

5.1 Introduction

As part of the City of Oakdale's wellhead protection planning process, an inventory of potential contaminant sources was conducted within the delineated drinking water supply management area (DWSMA). The purpose behind this inventory was to develop a database listing potential sources of contamination that may affect the public water supply wells for the City of Oakdale. The results of this effort provide the City with information about contaminant sources identified in the DWSMA. Wellhead protection planning strategies can be directed in a manner that will deal with any potential sites before they become a problem or a threat to Oakdale's drinking water supply.

5.2 Land Use

Following a scoping meeting held with Minnesota Department of Health (MDH) staff in February 2016, the City proceeded to locate information about land and water use within the delineated 10-year DWSMA for Oakdale's wells. Any data which was relevant to the City's wells, the quality of the water being drawn in to the wells, or land and groundwater uses around the wells was considered important in determining any potential threat to the water supply. The following criteria were used:

1. All areas must be inventoried as to the types of land and water uses, as discussed below.
2. All areas within the groundwater portion of the DWSMA delineation will require an inventory of wells or other borings or excavations that penetrate bedrock-confining units.
3. All areas must be evaluated for the presence of sources of fuels, solvents, or other chemicals. This includes registered storage tanks.
4. Known spill and leak sites will be inventoried within the DWSMA.

Each of these elements is described separately below.

5.3 Parcel-Specific Land and Water Uses

Understanding land use is important in determining key areas for concern in managing a wellhead protection area. For example, knowledge about the location of future commercial development in relation to the DWSMA may reveal a need to closely manage the activity within more sensitive areas.

Additionally, any parcels that currently pose a potential threat to the City's water supply should be highlighted to increase awareness of any concerns. Electronic database and GIS shape files are available on disk.

Parcels in DWSMAs have been delineated on Figure 2, according to their current zoned land uses. Future planned land uses from the 2030 Comprehensive Plan are shown on Figure 3. The majority of

the parcels in Oakdale's DWSMA are shown to be residential, with a mixture of commercial and industrial land uses also present. Commercial or industrial land uses have the greatest potential to contain point sources of contamination (e.g. storage tanks) while residential land uses have a greater potential for pollution from unused, unsealed wells.

Land uses are unlikely to change significantly over the 10-year lifetime of this plan. The most significant changes noted in the 2030 Comprehensive Plan include an expansion of residential areas, with more commercial and industrial growth in currently undeveloped parcels.

Very little agricultural land uses are present in the DWSMA. Only two small farms are currently present within the management area.

5.4 Wells

An important component of the potential contaminant source inventory was the location of any known wells within the DWSMA. Since wells may penetrate confining layers that normally protect an aquifer, they are potential pathways for contaminants to rapidly enter the aquifer. A search for active and unsealed wells was undertaken for the entire DWSMA.

The following sources were used to identify wells in the DWSMA:

1. Minnesota Geological Survey's County Well Index (CWI)
2. Personal interviews with City staff
3. Site reconnaissance
4. Mailed well surveys
5. Aerial photos

In general, information from the CWI and the City of Oakdale was used to identify known wells, while the information from the MDH was used to document abandoned or sealed wells. City staff and site reconnaissance was useful in identifying locations for the identified wells.

The results of the well search indicated 132 known wells currently in the DWSMA for the City of Oakdale, including the municipal supply wells. However, a previous well survey conducted by the City of Oakdale as part of an implementation grant in 2015 indicated that eight of those wells have been sealed. For reference, these sealed wells are left in the inventory, since their status differs from that on record in the County Well Index. An additional six wells are currently categorized as inactive, though it is unknown whether they have been sealed or not. A listing of all identified wells is provided in Table A-1 in Appendix A and their mapped locations are depicted in Figure 4. No known unused, unsealed municipal wells are believed to exist within the DWSMA for Oakdale. Oakdale Well 6, which is currently an emergency use only well, is outside of the existing DWSMA.

Another type of well that is inventoried as part of the Wellhead Protection Plan is Class V injection wells. These wells include shallow disposal wells and automotive drains that are not connected to municipal sewer service. At present, no known Class V injection wells were identified within the DWSMA, but the lack of a formal database for these wells makes them difficult to locate and verify.

The implementation plan in Chapter 8 will include strategies to help locate and manage Class V wells over the coming decade.

5.5 Point Sources

An important component of the potential contaminant source inventory was to look for any point sources within the DWSMA that might be a threat to the quality of Oakdale's water supply. An example of a point source would be a storage tank contains of materials that, if introduced into the environment, might degrade the quality of the water pumped from the aquifer. For moderately vulnerable DWSMAs, petroleum storage tanks are of the highest priority, because the products in these tanks can break down confining geologic materials if leaks are allowed to go unchecked for a long period of time.

The first step in the point-source search was to investigate available resources listing potential sites of concern, including databases containing information about registered storage tanks. Once this information was collected, it was reviewed for accuracy and was also reviewed with City staff in order to identify sites that are currently within the delineated DWSMA. Figure 5 shows the mapped storage tank sites, while Tables A-2 in Appendix A contain information about these sites. A total of 19 sites were identified with registered storage tanks. All of these sites are currently classified as "active" by the Minnesota Pollution Control Agency, which oversees the registration of petroleum storage tanks.

Petroleum pipelines were also mapped within the DWSMA and are shown on Figure 5. Two pipelines were identified within the DWSMA, with the Koch Pipeline transecting a large portion of the management area and intersecting the Emergency Response Area for Well 7.

5.6 Public Utility Services

For moderate vulnerability DWSMAs, public utilities of the greatest concern are stormwater and sanitary sewers that transmit potential contaminants across the DWSMA. Figure 7 shows the mapped sewer lines within the DWSMA. Management efforts for these sewers is generally focused on repairing or replacing lines which are known (or suspected) of leaking or exhibiting cracks.

Public water supply wells are also components of the public utility infrastructure. The locations of the Oakdale municipal wells are shown on Figure 1. No other known municipal wells are located in the DWSMA. Table A-1 in Appendix A lists all wells located within the DWSMA. Well locations are shown in Figure 4. (Note: Wells in Oakdale that were outside of the DWSMA were not inventoried for this planning effort.)

5.7 Former and Active Sites of Contamination

Figure 6 contains an inventory of mapped spill and leak sites, with Table A-3 in Appendix A summarizing each of these sites. A total of 21 identified spill or leaks sites was found in the State's database. Of these sites, two are still listed as "active," meaning that ongoing cleanup or monitoring is still taking place at those sites. Inactive sites are no longer under investigation at this time, with the assumption that any remaining contaminants on those sites pose little risk to groundwater resources at this time.

Should any new contamination sites be identified within the DWSMA, they will be prioritized in order of the threat they pose to the City's municipal wells. Site specific soil conditions, geology, surface runoff, and estimated time of travel to the City's wells will be investigated to assess the level of threat to the City's water supply.

5.8 Summary

The following table summarizes the number of identified sites for the Oakdale potential contaminant source inventory. The Emergency Response Area is the one-year groundwater capture zone for the City's two municipal wells.

Identified Potential Contamination Source	Number of Sites in DWSMA	Number of Sites in Emergency Response Area	Number of Site in Inner Wellhead Management Zone**
Groundwater Wells (known)	132*	2**	0
Class V Wells	0	0	0
Registered Storage Tank Sites	19	0	0
Documented Spill or Leak Sites	21	2	0
Pipelines	2	1	0

*Includes 8 sealed wells and 6 inactive wells
**Inventoried wells does not include the Oakdale municipal wells
***Includes items inventoried in IWMZs for non-primary wells

6.0 PROJECTED CHANGES TO THE ENVIRONMENT, LAND USE, AND SURFACE AND GROUNDWATER

6.1 Changes to the Environment and Land Use

While large portions of the DWSMA for Oakdale have been developed, continued development of residential properties is expected to continue over the 10-year life of this plan. The DWSMA contains commercial and industrial areas in Oakdale as well. Not all of the parcels within these areas are fully developed, so additional business and industries may be added over the life of this plan. This type of development may produce additional potential contaminant sources within the DWSMA, depending on the nature of businesses that may develop within these areas.

The DWSMA overlaps into the cities of Lake Elmo and North St. Paul. Land uses in this portion of the DWSMA are mostly zoned as residential, with a small portion of commercial property in North St. Paul.

6.2 Changes to Surface and Groundwater

It is expected that the current water supply system for the City of Oakdale will be able to supply the majority of the project demand over the next ten years. New municipal wells will only be added when growth necessitates expansion of the water supply capacity. As new wells are constructed and brought online, the City will work with the MDH to determine the need to amend this Wellhead Protection Plan accordingly.

Other high capacity wells may be developed by surrounding cities during the life of this plan. The Minnesota DNR is charged with reviewing and approving appropriation permits for new high capacity wells. It is assumed that, as part of the North and East Metro Groundwater Management Area, the DNR will require evidence and monitoring to demonstrate that new (or amended) well permits will not create unsustainable pumping conditions. Likewise, well plan review by the MDH should help to verify that new municipal wells do not negatively impact the DWSMAs for existing water supply wells.

7.0 PROBLEMS AND OPPORTUNITIES

7.1 Problems

1. The DWSMA for Oakdale's wells is moderately vulnerable to contamination. This conclusion was established by water chemistry, age dating techniques indicating "young" water, and the geologic setting (i.e., the absence of a fine-grained confining layer in many areas).
2. Portions of the DWSMA include areas of commercial and industrial activity, some of which represent potential point sources of contaminants.
3. PFC contamination is widespread in southern Washington County, with at least one type of PFC being detected in all eight of the City of Oakdale's wells.
4. The number and location of improperly abandoned wells in the DWSMA is not known with a high degree of certainty.
5. There is no accurate inventory or database for Class V wells, so it is unknown how many Class V wells exist within the DWSMA.
6. A small portion of the DWSMA falls outside of the city limits of Oakdale, making management of these areas nearly impossible to accomplish without cooperation from other local units of government.
7. Major transportation corridors, including highways and pipelines, intersect the DWSMA.
8. Existing leak sites within the DWSMA create uncertainty for the potential of contamination to later affect the City's wells.

7.2 Opportunities

1. Since the DWSMA extends beyond Oakdale's borders, an opportunity exists to work with Lake Elmo and North St. Paul in planning land uses in order to protect the area's groundwater resources.
2. Washington County offers assistance in managing wellhead protection areas. This assistance includes grant funding and financial aid to seal unused wells located in wellhead protection areas.
3. Relatively few potential point sources of contamination were identified within the Emergency Response Areas.
4. A watershed district exists to manage surface water drainage for all areas of the DWSMA.
5. Despite the vulnerable setting, the water quality of groundwater historically pumped is very good and meets health guidelines, with the exception of certain PFCs which require filtration to meet MDH standards.
6. Limiting the installation of new wells, along with sealing of unused wells, in areas covered by the DWSMA delineation would reduce potential pathways for contamination to reach the aquifers.

7.3 Status of Existing Governmental Controls Concerning Water and Related Land Use

There are many tools available to the regulating agencies that may be used to achieve the wellhead protection planning goals identified by the wellhead planning team. State and local governmental units, such as MDH, Washington County, and the DNR, regulate:

- Well construction – MDH
- Well sealing – MDH
- State groundwater appropriation permits – DNR
- Public water supply quality – MDH
- Setbacks for specific contaminant sources from a well – MDH and local governments through conditional use permitting
- Land use controls – Local governments (City of Oakdale, City of Lake Elmo, City of North St. Paul), Met Council
- Tank control program – MPCA, MDA (Minnesota Department of Agriculture)
- Shallow disposal wells - U.S. EPA
- Stormwater Discharge Permitting – MPCA, Watershed Organizations
- Storage and use of agricultural chemicals and pesticides – MDA

Any of the permitted activities which have the potential to affect the wellhead protection delineation and/or the quality or quantity of the City of Oakdale water supply should be reviewed by the respective county, state, or federal agency before a permit can be approved.

The implementation portion of this plan establishes periodic review of controls over land uses and zoning within the DWSMA. Possible changes to controls will be considered during the appropriate stages of plan implementation.

8.0 WELLHEAD PROTECTION GOALS, OBJECTIVES AND IMPLEMENTATION PLAN

Goals and objectives have been developed based on the results of the vulnerability analysis, the results of the potential contaminant source inventory, and local geologic conditions. In general, goals and objectives are ranked in order of priority.

8.1 Goals

The following goals form the framework within which the information generated during delineation and source inventory activities is evaluated and upon which the planning activities are based:

1. To continue to provide high quality water that meets state and federal drinking water standards.
2. To develop the water supply system and land use activities with aquifer protection as a consideration.
3. Practice prevention strategies for properties containing potential contaminant sources to avoid adversely impacting the quality of groundwater.
4. To work cooperatively with other nearby local units of government including the watershed district, Washington County, adjacent communities, and state agencies on regional aquifer protection actions.
5. Build awareness of wellhead protection goals among and disseminate information about wellhead protection plan implementation to the City's staff, residents, and business community.

8.2 Objectives

To meet these goals, the following specific objectives were developed:

1. Continue to monitor and evaluate risks associated with known sources of groundwater contamination.
2. Work with pipeline companies to ensure appropriate spill response measures are in place in the event of a spill within the DWSMA.
3. Continue commitment to manage unused, unsealed wells effectively by making sure they are sealed properly, as appropriate.
4. Educate owners of properties containing potential contaminant sources (storage tanks, etc.) of the importance of spill prevention.
5. Attempt to locate and manage Class V wells within the DWSMA.
6. Review new and redevelopment plans within the DWMSA for their potential to impact groundwater quality.
7. Develop public education materials to enlist support of community in groundwater management goals
8. Collect additional data to better define the age of water in the City's wells.
9. Request notification from other local units of government for any changes that may affect the management of the DWSMA.

10. Manage and maintain sanitary sewer and storm sewer systems with wellhead protection goals in mind.

8.3 Implementation Plan

Objective 1: Continue to monitor and evaluate risks associated with known sources of groundwater contamination.

Action 1A:	Continue cooperation and involvement with decision-making regarding known sites of contamination
Who:	City of Oakdale staff
Cooperators:	MDH, MPCA, 3M
When:	Ongoing, reviewed annually
Effort:	Staff time
How:	Assist State agencies with sampling related to PFCs and other potential contaminants. Review monitoring reports and provide feedback to 3M and State agencies regarding areas of concern. Review and comment on any potential changes to contamination site monitoring or management.
Status:	Continuation of ongoing policies.

Action 1B:	Review status of identified contaminant sources in DWSMA on an annual basis.
Who:	City of Oakdale staff
Cooperators:	MPCA, MDH, MDA, Washington County
When:	2017, 2019, 2021, 2023, 2025
Effort:	Staff time
How:	Contact designated Point Of Contact staff at MDH, MPCA, and MDA staff acting as a liaison to the wellhead protection program. Inquire about potential changes known to have occurred in DWSMA in preceding year.
Status:	Inquiries to be completed as scheduled.

Action 1C:	Determine if state agencies have knowledge of new spills or potential contaminant sources in the DWSMA.
Who:	City of Oakdale staff
Cooperators:	MPCA, MDA
When:	2017, 2019, 2021, 2023, 2025
Effort:	Staff time
How:	Same as for Action 1C. Make formal contact with relevant agencies. Request status updates from agencies for active leak sites or sites with ongoing investigations/monitoring to determine if the sites continue to pose a threat to the City's drinking water source.
Status:	Inquiries to be completed as scheduled.

Action 1D: Review setback of potential contamination sources from the Inner Wellhead Management Zone (200 foot radius) around each municipal well
Who: City of Oakdale staff
Cooperators: MDH
When: 2017, 2022
Effort: 10 hours
How: Complete worksheet inventory of potential contamination sources located within the Inner Wellhead Management Zone.
Status: Not yet implemented

Objective 2: Work with pipeline companies to ensure appropriate spill response measures are in place in the event of a spill within the DWSMA.

Action 2A: Contact pipelines companies to determine current spill response measures in place to protect aquifers. Make pipelines companies aware of wellhead protection concerns and provide recommendations for spill management.
Who: City of Oakdale staff
Cooperators: Washington County, MDH, Pipeline companies
When: 2019
Effort: Staff time
How: Establish communications with pipeline companies. Provide a copy of this Wellhead Protection Plan to raise aware of aquifer protection requirements. Request to review current spill response measures and provide recommendations for additional actions to be implemented.
Status: Not currently implemented.

Objective 3: Continue commitment to manage unused, unsealed wells effectively by making sure they are sealed properly, as appropriate.

Action 3A: Provide MDH with a list of abandoned and unsealed well locations as City staff discover them.
Who: City of Oakdale staff
Cooperators: MDH, Washington County
When: Ongoing
Effort: Staff time
How: Prepare written report for distribution MDH and Washington County identifying wells that are in need of sealing.
Status: Currently implemented

Action 3B:	Make property owners aware of financial and technical resources available to assist in securing grant funding for properly sealing wells.
Who:	City of Oakdale staff
Cooperators:	MDH, Washington County
When:	Ongoing
Effort:	Staff time
How:	Research types of grants and loans available for permanent well sealing and distribute this information to appropriate well owners. Make information about grants known using City's website and newsletter. Make direct contact with properties where unused wells are suspected to exist.
Status:	Not currently implemented.

Action 3C:	Complete a written survey of suspected well sites in order to determine the status of wells on these properties
Who:	City of Oakdale staff
Cooperators:	MDH, Current property owners
When:	2021
Effort:	Staff time
How:	Send survey to property owners to determine status of any known or suspected wells. Provide information regarding best management practices for wells, including currently regulations for sealing unused wells. Provide information regarding well sealing grants and cost-share programs. Offer assistance in sealing wells.
Status:	Not currently implemented.

Action 3D:	Apply for grant funding to sealed unused wells.
Who:	City of Oakdale staff
Cooperators:	MDH, Washington County
When:	As unused, unsealed wells are identified
Effort:	Staff time
How:	Offer assistance to property owners to help seal unused wells. Apply for grants to seal wells as they are identified.
Status:	To be implemented as needed

Objective 4: Educate owners of properties containing potential contaminant sources (underground storage tanks, hazardous wastes, etc.) of the importance of spill prevention.

Action 4A: Contact relevant property owners and make them aware of their placement within the City's wellhead protection area. Educate them on the importance of keeping up to code with all federal, state, and local rules regarding their potential sources of contamination.
Who: City of Oakdale Staff
Cooperators: MPCA, MDH
When: 2020
Effort: Staff time, printing and postage
How: Send mailing out to property owners. Provide contact numbers for appropriate government agencies if requested.
Status: Not currently implemented.

Objective 5: Attempt to locate and manage Class V wells within the DWSMA.

Action 5A: Use newsletter or website to educate property owners on how to identify Class V wells on their property.
Who: City of Oakdale staff
Cooperators: Washington County, MDH, US EPA
When: 2019
Effort: Staff time
How: Prepare article outlining how to identify Class V wells. Provide information and links to US EPA guidelines on how to manage Class V wells.
Status: Not currently implemented.

Objective 6: Review new and redevelopment plans within the DWMSA for their potential to impact groundwater quality.

Action 6A: Review new development and redevelopment plans.
Who: City of Oakdale Staff
Cooperators: Washington County, South Washington Watershed District
When: Ongoing, as needed
Cost: Staff time
How: Review wellhead protection considerations of proposed new development or redevelopment plans submitted to City. Identify and communicate concerns related to groundwater protection within the DWSMA.
Status: Ongoing

Objective 7: Develop public education materials to enlist support of community in groundwater management goals.

Action 7:	Use City's website, brochures, and/or newsletter to enlist public support for the Wellhead Protection Plan.
Who:	City of Oakdale Staff
Cooperators:	MDH
When:	2017, then reviewed annually and revised accordingly
Effort:	Staff time, publishing costs
How:	Maintain wellhead protection information on City's website. Continue using newsletters to reach public. Continue providing wellhead protection brochure at public buildings, including City Hall and Public Works.
Status:	Not currently implemented.

Objective 8: Collect additional data to better define the age of water in the City's wells.

Action 8A:	Sample Wells 1, 8, and 9 to determine tritium concentrations in order to refine vulnerability assessments for these wells (and the surrounding DWSMA).
Who:	MDH
Cooperators:	City of Oakdale Staff
When:	2021
Effort:	Sampling costs, staff time
How:	Request that Wells 1, 8, and 9 are sampled for tritium. Also, if other age dating testing methods are deemed suitable by the MDH in order to assess aquifer vulnerability, request that these samples also be collected.
Status:	Not currently implemented.

Objective 9: Request notification from other local units of government for any changes that may affect the management of the DWSMA.

Action 9A:	Contact local units of government within the DWSMA and ask to be notified regarding changes that may impact the management of the Wellhead Protection Plan
Who:	City of Oakdale Staff
Cooperators:	Neighboring communities, Washington County, South Washington Watershed District, MDH
When:	2017, 2022
Effort:	Staff time
How:	Contact appropriate staff at other local government units to determine what changes have been made in the DWSMA and how those changes may impact management of this area. Potential changes may include new permits, land use changes, new wells, amended wellhead protection plans, etc.
Status:	Not currently implemented.

Objective 10: Manage and maintain sanitary sewer and storm sewer systems with wellhead protection goals in mind.

Action 10A:	Replace or repair any sewer lines that are observed to be leaking, cracked, or deteriorated within highly vulnerable wellhead protection areas.
Who:	City of Oakdale Staff
Cooperators:	MDH
When:	Ongoing, as needed
Effort:	Sewer replacement costs
How:	If surveys or investigations show that sanitary or storm sewer lines have significantly deteriorated within highly vulnerable wellhead protection areas, add sewer repairs or replacements to City's Capital Improvement Plan. Highest priority should be given to any deteriorated sewers observed within the ERA (emergency response area) and the IMWZ (inner wellhead management zone).
Status:	Not formally implemented as part of wellhead protection measures.

9.0 PROGRAM EVALUATION

Oakdale will evaluate the progress of the implementation plan every two years. The wellhead protection plan manager will prepare a short progress report to be completed by December 31 of each even-numbered calendar year, starting in the year 2018. The progress report will briefly discuss the actions implemented by the City or any cooperators during the previous two years, and actions that will be completed in the following two years. The progress report will be distributed to the City Council for their review after which it will be submitted to MDH.

According to Minnesota wellhead protection rules, this wellhead protection plan will be updated every 10 years from date of adoption or with the installation of any new municipal well to the water supply system.

10.0 EMERGENCY PREPAREDNESS AND CONTINGENCY PLAN

The City of Oakdale currently has a DNR Water Supply Plan that was approved on December 31, 2009. Documentation of plan approval is included in Appendix C of this document.

This Water Supply Plan contains the required elements of the MN Wellhead Protection Rule and is accepted as an Alternative Water Supply/Contingency Plan as defined in 4720.5280. The plan outlines actions and procedures to undertake in the event there is a partial or total loss of the City's water supply source or infrastructure.

11.0 LOCAL GOVERNMENT REVIEW AND PUBLIC HEARING

The draft Oakdale wellhead protection plan was submitted to local units of government for their review and comments on Janaury 9, 2017. The required 60-day review period ended on March 24, 2017. Written comments were received by the Metropolitan Council and are provided in Appendix D. Comments have been considered and, where appropriate, modifications were made to Wellhead Protection Plan to address those comments.

A public hearing was held the evening of March 28, 2017 at the Oakdale City Hall as part of the regular City Council meeting. At the hearing, no comments received from the general public.

Documentation for the public hearing is provided in Appendix F.

FIGURES

N

0 ¼ ½ MILE

LEGEND

- CITY WELL
- EMERGENCY RESPONSE AREA
- WELLHEAD PROTECTION AREA
- MODERATE VULNERABILITY DRINKING WATER SUPPLY MANAGEMENT AREA

BASE MAPPING

- CITY LIMITS
- PARCEL

CITY OF OAKDALE

CITY OF NORTH SAINT PAUL

WELL 10

WELL 3

CITY OF MAPLEWOOD

CITY OF OAKDALE

WELL 8

CITY OF LAKE ELMO

WELL 5

WELL 9

WELL 7

CITY OF LAKE ELMO

CITY OF OAKDALE

WELL 1

WELL 2

FIGURE 1 - DWSMA DELINEATION AND VULNERABILITY

OAKDALE WELLHEAD PROTECTION PLAN

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

APRIL 2016

V:\1938\active\193801820\GIS\Projects\Part 2 Figure 1 - DWSMA.mxd

N

0 ¼ ½ MILE

CITY OF OAKDALE

CITY OF NORTH SAINT PAUL

CITY OF MAPLEWOOD

CITY OF LAKE ELMO

WELL 10

WELL 3

WELL 8

WELL 5

WELL 9

WELL 7

WELL 1

WELL 2

LEGEND

- CITY WELL
- EMERGENCY RESPONSE AREA
- WELLHEAD PROTECTION AREA
- DRINKING WATER SUPPLY MANAGEMENT AREA

EXISTING ZONING

- COMMERCIAL
- INDUSTRIAL/OFFICE
- INDUSTRIAL
- PLANNED UNIT DEVELOPMENT
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- HIGH DENSITY RESIDENTIAL
- RADIO AND TV TOWER
- WATER/WETLAND

BASE MAPPING

- CITY LIMITS
- PARCEL

FIGURE 2 - EXISTING ZONING

OAKDALE WELLHEAD PROTECTION PLAN

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

APRIL 2016

V:\1938\active\193801820\GIS\Projects\Part 2 Figure 2 - Zoning.mxd

N

0 ¼ ½ MILE

CITY OF OAKDALE

CITY OF NORTH SAINT PAUL

WELL 10

WELL 3

CITY OF MAPLEWOOD

CITY OF OAKDALE

WELL 8

CITY OF LAKE ELMO

WELL 5

WELL 9

WELL 7

CITY OF LAKE ELMO

CITY OF OAKDALE

WELL 1

WELL 2

LEGEND

- CITY WELL
- EMERGENCY RESPONSE AREA
- WELLHEAD PROTECTION AREA
- DRINKING WATER SUPPLY MANAGEMENT AREA

PLANNED LAND USE

- COMMERCIAL
- INDUSTRIAL/OFFICE
- INDUSTRIAL
- MIXED USE
- INSTITUTIONAL/PUBLIC
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- HIGH DENSITY RESIDENTIAL
- OPEN SPACE/PARK
- WATER

BASE MAPPING

- CITY LIMITS
- PARCEL

FIGURE 3 - FUTURE LAND USE

OAKDALE WELLHEAD PROTECTION PLAN

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

APRIL 2016

V:\1938\active\193801820\GIS\Projects\Part 2 Figure 3 - Land Use.mxd

N

0 ¼ ½ MILE

LEGEND

- CITY WELL
- COORDINATE LOCATED WELL
- ADDRESS LOCATED WELL
- EMERGENCY RESPONSE AREA
- WELLHEAD PROTECTION AREA
- DRINKING WATER SUPPLY MANAGEMENT AREA

BASE MAPPING

- CITY LIMITS
- PARCEL

CITY OF OAKDALE
CITY OF NORTH SAINT PAUL
CITY OF MAPLEWOOD
CITY OF LAKE ELMO
CITY OF OAKDALE
CITY OF LAKE ELMO
CITY OF OAKDALE

WELL 10
WELL 3
WELL 8
WELL 5
WELL 9
WELL 7
WELL 2
WELL 1

231863
242986
255678
251934
00208433
686294
773389
190337
200440
235622
763351
190333
208454
686284
553016
553017
553018
652406
741722
741723
741724
552571
761336
417142
417140
587179
552568
552569
552570
W0001044
134754
696670
696672
696671
696673
686293
785567
785568
785569
403790
403791
403792
403793
235516
403794
403795
403796
403798
403786
403787
403788
403789
761337
761338
761339
761340
761341
761342
761343
761344
761345
761346
761347
737656
737657
727752
727753
737653
727754
727755
417141
539527
539526
539528
247185
256769
257397
572608
585145
576160
598819
614269
609537
606937
678196
588139
575148
W0001121
617699
607488
554316
577036
569782
569978
569982
616945
670763
598818
554311
554312
244659
270045
737654
737655
498625
498624
498626
257354
404224
244655
523392
W0001130
590079
599954
575072
587407
569752
611059
624051
620100
620099
463534
589227
208462
208463
243461
257404
257566
112538
243440
249010
127287

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

FIGURE 4 - WELLS WITHIN DWSMA

OAKDALE WELLHEAD PROTECTION PLAN

APRIL 2016

V:\1938\active\193801820\GIS\Projects\Part 2 Figure 4 - Wells.mxd

N

0 ¼ ½ MILE

LEGEND

- STORAGE TANK SITE
- PIPELINE ROUTE
- CITY WELL
- EMERGENCY RESPONSE AREA
- WELLHEAD PROTECTION AREA
- DRINKING WATER SUPPLY MANAGEMENT AREA

BASE MAPPING

- CITY LIMITS
- PARCEL

CITY OF OAKDALE

CITY OF NORTH SAINT PAUL

Holiday Stationstore 441

WELL 10

WELL 3

AMOCO OIL CO.

KOCH PIPELINE CO.

Mndot Truck Station

Holiday Stationstore

Kwik Trip #869

SuperAmerica

Former Crown Auto

Oakdale Rental

Mo-Tech Corp

Oakdale Lift Station L-11

WELL 8

CITY OF MAPLEWOOD

CITY OF LAKE ELMO

Oakdale Bulk Plant

CITY OF OAKDALE

Ryder Student Transportation Services

Oakdale Public Works Dept

WELL 5

KOCH PIPELINE CO.

WELL 9

Oakdale Food & Fuel

WELL 7

CITY OF LAKE ELMO

Holiday Stationstore #352

Hy-Vee Gas

CITY OF OAKDALE

Tartan Senior High School

WELL 1

WELL 2

FIGURE 5 - TANKS AND PIPELINES WITHIN DWSMA

OAKDALE WELLHEAD PROTECTION PLAN

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

APRIL 2016

V:\1938\active\193801820\GIS\Projects\Part 2 Figure 5 - Tanks & Pipelines.mxd

N

0 ¼ ½ MILE

CITY OF OAKDALE

Red Oak Preserve

Kopeska Property

Grzywinski Residence

CITY OF NORTH SAINT PAUL

Holiday Stationstore 441

WELL 10

WELL 3

Mndot Truck Station

Mn Dept Of Transportation

Kwik Trip #869

Former Crown Auto

Koch Pipeline - Mile Post 238

Bob Hackney Property

WELL 8

CITY OF MAPLEWOOD

CITY OF LAKE ELMO

Mathews Residence

CITY OF OAKDALE

Ryder Student Transportation Services

WELL 5

Briar Pond Apartments

Hadley & 15th Street Dump

WELL 9

Oakdale Food & Fuel

WELL 7

CITY OF LAKE ELMO

Holiday Stationstore #352

CITY OF OAKDALE

Tartan Senior High School

WELL 1

WELL 2

LEGEND

- DOCUMENTED LEAK SITE
- CITY WELL
- EMERGENCY RESPONSE AREA
- WELLHEAD PROTECTION AREA
- DRINKING WATER SUPPLY MANAGEMENT AREA

BASE MAPPING

- CITY LIMITS
- PARCEL

FIGURE 6 - SPILLS AND LEAKS WITHIN DWSMA

OAKDALE WELLHEAD PROTECTION PLAN

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

APRIL 2016

V:\1938\active\193801820\GIS\Projects\Part 2 Figure 6 - Leaks.mxd

N

0 ¼ ½ MILE

CITY OF OAKDALE

CITY OF NORTH SAINT PAUL

WELL 10

WELL 3

CITY OF MAPLEWOOD

WELL 8

CITY OF LAKE ELMO

CITY OF OAKDALE

WELL 5

WELL 9

WELL 7

CITY OF LAKE ELMO

CITY OF OAKDALE

WELL 1

WELL 2

LEGEND

- SANITARY SEWER
- STORM SEWER
- CITY WELL
- EMERGENCY RESPONSE AREA
- WELLHEAD PROTECTION AREA
- DRINKING WATER SUPPLY MANAGEMENT AREA

BASE MAPPING

- CITY LIMITS
- PARCEL

FIGURE 7 - SANITARY AND STORM SEWERS

OAKDALE WELLHEAD PROTECTION PLAN

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

JULY 2016

V:\1938\active\193801820\GIS\Projects\Part 2 Figure 7 - Pipes.mxd

APPENDIX A

WELLS AND POTENTIAL CONTAMINANT SOURCE INVENTORY

TABLE A-1: MAPPED GROUNDWATER WELLS, OAKDALE WELLHEAD PROTECTION PLAN INVENTORY

UNIQUE NUMBER	WELL NAME	ADDRESS	CITY	STATE	TOWN-SHIP	RANGE	SECTION	SUB-SECTION	RECORDED STATUS	WELL USE	WELL DEPTH (FEET)	CASING DEPTH (FEET)	AQUIFER	PCSI CODE	UTM E COORD	UTM N COORD	LOCATION METHOD
112538	STOLTZ, DAWN MARIE	547 GLENBROOK AVE N	OAKDALE	MN	29	21W	31	BCDAA	ACTIVE	IRRIGATION	217	190	OSTP	WEL	501606	4978152	COORDINATE
127287	OAKDALE 5		OAKDALE	MN	29	21W	29	BCBBBD	ACTIVE	PUBLIC SUPPLY	520	436	CJDN	WEL	502842	4980013	COORDINATE
134754	IDEAL LOCATIONS LLC	3240 IDEAL AV N	NORTH ST PAUL	MN	29	21W	17	DDABCC	SEALED	DOMESTIC	138	134	OSTP	WEL	504216	4982373	COORDINATE
190333	3M NO.1101 PARK			MN	29	21W	18	AAADAD	ACTIVE	TEST WELL	78	78	OPVL	WEL	502794	4983548	COORDINATE
190337	3M NO.1102 CONDO		OAKDALE	MN	29	21W	18	ABBABB	ACTIVE	TEST WELL	119	107	OPVL	WEL	502160	4983656	COORDINATE
200440	CROSSLY, CLYDE	B CR	NORTH ST PAUL	MN	29	22W	13	AAAAAB	ACTIVE	DOMESTIC	200	180	OSTP	WEL	501191	4983690	COORDINATE
208433	ZAHLER, ED		LAKE ELMO	MN	29	21W	7	CACDDC	ACTIVE	DOMESTIC	127	121		WEL	501764	4984133	COORDINATE
208454	OAKDALE 3	3888 HADLEY AV N	OAKDALE	MN	29	21W	18	AADBBD	ACTIVE	PUBLIC SUPPLY	510	424	CJDN	WEL	502651	4983443	COORDINATE
208462	OAKDALE 1		OAKDALE	MN	29	21W	31	AADBAA	ACTIVE	PUBLIC SUPPLY	581	501	CJDN	WEL	502683	4978650	COORDINATE
208463	OAKDALE 2	6492 7TH ST	OAKDALE	MN	29	21W	31	BDAAAB	ACTIVE	PUBLIC SUPPLY	542	458	CJDN	WEL	501954	4978446	COORDINATE
231863	WHISPERING OAKS MHP 1		OAKDALE	MN	29	21W	8	BCBAAA	SEALED	PUBLIC SUPPLY	265	176	OSPC	WEL	502997	4984885	COORDINATE
235516	BLUMER, LAURA M	6934 35TH ST N	OAKDALE	MN	29	21W	18	DAABAB	ACTIVE	DOMESTIC	80	68	OPVL	WEL	502671	4982868	COORDINATE
235622	FRECHETTE, JOYCE A. TRUST	3608 GERSHWIN LN N	OAKDALE	MN	29	21W	18	BBCAAB	UNKNOWN	DOMESTIC	288	237	MTPL	WEL	501353	4983359	COORDINATE
242986	JOHNSON, MELISSA CARRIE JEAN	6010 46TH ST N	OAKDALE	MN	29	21W	7	BCCBAD	ACTIVE	DOMESTIC	172	172	QUUU	WEL	501311	4984659	COORDINATE
243440	LUMEN, ALEXANDRA	612 GOODVIEW AV N	OAKDALE	MN	29	21W	31	BDBCDD	UNKNOWN	DOMESTIC	96	91	ODCR	WEL	501682	4978279	COORDINATE
243461	CHERYL GUTHMILLER	694 GLENBROOK AV N	OAKDALE	MN	29	21W	31	BCAADA	SEALED	DOMESTIC	121	88	MTPL	WEL	501583	4978383	COORDINATE
244655	BRETZEL, RYAN AND EMILY	2364 GROSSPOINT AV N	OAKDALE	MN	29	21W	19	DADBBA	SEALED	DOMESTIC	125	0	QUUU	WEL	502638	4981043	COORDINATE
244659	TOLLEFSON, MATTHEW AND CHRISTINA	2723 HAYWARD AV N	OAKDALE	MN	29	21W	20	BDABBC	SEALED	DOMESTIC	178	124	MTPL	WEL	503409	4981637	COORDINATE
247185	US BANK NATL ASSOC	2901 HADLEY AV N	OAKDALE	MN	29	21W	20	BBBCDC	INACTIVE	DOMESTIC	166	146	OSTP	WEL	502850	4981863	COORDINATE
249010	BARTH, DAVID J	593 GLENBROOK AV	OAKDALE	MN	29	21W	31	BDCBBD	INACTIVE	DOMESTIC	166	0	OSTP	WEL	501658	4978264	COORDINATE
251934	LOCKWOOD, HAROLD	6273 45TH ST N	OAKDALE	MN	29	21W	7	CABBBD	UNKNOWN	DOMESTIC	179	0	QBAA	WEL	501638	4984455	COORDINATE
255678	MINNE, KATHY	6036 UPPER 44TH ST N	OAKDALE	MN	29	21W	7	CBBACB	INACTIVE	DOMESTIC	212	0	QBAA	WEL	501328	4984440	COORDINATE
256769	MYERS, CHRIS AND MARY	2914 HAMLET AV N	OAKDALE	MN	29	21W	20	BBADAD	INACTIVE	DOMESTIC	107	104	OPVL	WEL	503177	4981930	COORDINATE
257354	SCHMIDT, KELLEY R	6424 STILLWATER BL N	OAKDALE	MN	29	21W	19	CACABA	UNKNOWN	-	130	123	OPVL	WEL	501745	4981065	COORDINATE
257397	WRICH, JACOB AND KATHERINE	7607 STILLWATER WA	OAKDALE	MN	29	21W	20	ABBADA	UNKNOWN	DOMESTIC	153	146	OSTP	WEL	503793	4981997	COORDINATE
257404	GORTON, LORIN J.	605 GLENBROOK AV N	OAKDALE	MN	29	21W	31	BDBCCA	UNKNOWN	-	97	87	ODPL	WEL	501635	4978293	COORDINATE
257566	JERDE, DENISE	601 GLENBROOK AV N	OAKDALE	MN	29	21W	31	BDBCCC	UNKNOWN	-	184	0	OSTP	WEL	501626	4978282	COORDINATE
270045	DELANEY, JOE	7287 STILLWATER BL	OAKDALE	MN	29	21W	20	BDBDCB	INACTIVE	DOMESTIC	195	168	OSTP	WEL	503314	4981493	COORDINATE
403786	3M PW-1			MN	29	21W	18	DBC	ACTIVE	MONITORING	83	6		WEL	502105	4982581	ADDRESS
403787	3M PW-2			MN	29	21W	18	DBC	ACTIVE	MONITORING	92	26		WEL	502105	4982581	ADDRESS
403788	3M PW-3			MN	29	21W	18	DBC	ACTIVE	MONITORING	67	6		WEL	502105	4982581	ADDRESS
403789	3M PW-4			MN	29	21W	18	DBC	ACTIVE	MONITORING	79	6		WEL	502105	4982581	ADDRESS
403790	3M PW-5			MN	29	21W	18	DBD	ACTIVE	MONITORING	40	7		WEL	502304	4982577	ADDRESS
403791	3M PW-6			MN	29	21W	18	DBD	ACTIVE	MONITORING	51	6		WEL	502304	4982577	ADDRESS
403792	3M PW-7			MN	29	21W	18	DBD	ACTIVE	MONITORING	46	6		WEL	502304	4982577	ADDRESS
403793	3M PW-8			MN	29	21W	18	DBD	ACTIVE	MONITORING	53	6		WEL	502304	4982577	ADDRESS
403794	3M PW-9			MN	29	21W	18	DBD	ACTIVE	MONITORING	29	0		WEL	502304	4982577	ADDRESS
403795	3M PW-10			MN	29	21W	18	DDB	ACTIVE	MONITORING	32	6		WEL	502501	4982371	ADDRESS
403796	3M PW-11			MN	29	21W	18	DBC	ACTIVE	MONITORING	68	6		WEL	502105	4982581	ADDRESS
403798	3M PW-12			MN	29	21W	18	DBD	ACTIVE	MONITORING	31	6		WEL	502304	4982577	ADDRESS
404224	ANDY ZUERCHER WELL	2172 HADLEY AV N	OAKDALE	MN	29	21W	19	DAA	ACTIVE	DOMESTIC	290	249		WEL	502698	4981161	ADDRESS
417140	3M			MN	29	21W	17	CCA	ACTIVE	MONITORING	84	65		WEL	503101	4982368	ADDRESS
417141	3M			MN	29	21W	17	CCC	ACTIVE	MONITORING	94	73		WEL	502899	4982164	ADDRESS
417142	3M			MN	29	21W	17	CAB	ACTIVE	MONITORING	72	72		WEL	503305	4982775	ADDRESS

TABLE A-1: MAPPED GROUNDWATER WELLS, OAKDALE WELLHEAD PROTECTION PLAN INVENTORY

UNIQUE NUMBER	WELL NAME	ADDRESS	CITY	STATE	TOWN-SHIP	RANGE	SECTION	SUB-SECTION	RECORDED STATUS	WELL USE	WELL DEPTH (FEET)	CASING DEPTH (FEET)	AQUIFER	PCSI CODE	UTM E COORD	UTM N COORD	LOCATION METHOD
463534	OAKDALE 7	1265 HELMO AV	OAKDALE	MN	29	21W	29	CADDCA	ACTIVE	PUBLIC SUPPLY	563	467	CJDN	WEL	503536	4979300	COORDINATE
498624	HANSEN, MARK C.	6544 STILLWATER BL	OAKDALE	MN	29	21W	19	ACD	UNKNOWN	MONITORING	12	4		WEL	502089	4981226	ADDRESS
498625	HANSEN, MARK C.	6544 STILLWATER BL	OAKDALE	MN	29	21W	19	ACD	UNKNOWN	MONITORING	12	4		WEL	502089	4981226	ADDRESS
498626	HANSEN, MARK C.	6544 STILLWATER BL	OAKDALE	MN	29	21W	19	ACD	UNKNOWN	MONITORING	17	7		WEL	502089	4981226	ADDRESS
523392	REGAN, DONALD B.	6349 STILLWATER BL	OAKDALE	MN	29	21W	19	CCC	UNKNOWN	MONITORING	14	4		WEL	501733	4980760	ADDRESS
539526	3M			MN	29	21W	19	BAA	UNKNOWN	MONITORING	15	5		WEL	501902	4981979	ADDRESS
539527	3M			MN	29	21W	19	BAA	UNKNOWN	MONITORING	15	5		WEL	501902	4981979	ADDRESS
539528	3M				29	21W	19	BAA	UNKNOWN	MONITORING	20	10		WEL	501902	4981979	ADDRESS
552568	MENARD INC - MW-1	3205 HADLEY AV N			29	21W	17	CBC	UNKNOWN	MONITORING	15	3		WEL	502902	4982569	ADDRESS
552569	MENARDS INC	3205 HADLEY AV N		MN	29	21W	17	CBC	UNKNOWN	MONITORING	15	3		WEL	502902	4982569	ADDRESS
552570	MENARDS INC MW-3	3205 HADLEY AV N		MN	29	21W	17	CB	UNKNOWN	MONITORING	13	3		WEL	503003	4982671	ADDRESS
552571	MW-4	3205 HADLEY AV N		MN	29	21W	17	CBC	UNKNOWN	MONITORING	15	3		WEL	502902	4982569	ADDRESS
553016	MINNESOTA DEPARTMENT OF TRANSPORT/	3485 HADLEY AV N	OAKDALE	MN	29	21W	17	BCC	UNKNOWN	MONITORING	17	7		WEL	502905	4982975	ADDRESS
553017	MW-3 - MNDOT	3485 HADLEY AV N	OAKDALE	MN	29	21W	17	CBB	UNKNOWN	MONITORING	27	17		WEL	502904	4982772	ADDRESS
553018	MW-2	3485 HADLEY AV N	OAKDALE	MN	29	21W	17	BCC	UNKNOWN	MONITORING	28	18		WEL	502905	4982975	ADDRESS
554311	BRADY, JOHN & DAWN	8165 26TH ST N	LAKE ELMO	MN	29	21W	21	BCDCAB	INACTIVE	DOMESTIC	220	138	OSTP	WEL	504661	4981371	COORDINATE
554312	EKMAN, JOHN R. & DEBORAH A.	2528 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BCCCDD	ACTIVE	DOMESTIC	220	168	OSTP	WEL	504510	4981285	COORDINATE
554316	FAGLEY, TERRY P. & NANCY L.	2656 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BCBDBA	ACTIVE	DOMESTIC	220	168	OSTP	WEL	504554	4981560	COORDINATE
569752	FLEMING, BERNHART/JEANE	8047 22ND ST. CT N	LAKE ELMO	MN	29	21W	21	CCACDC	ACTIVE	DOMESTIC	250	222	OPDC	WEL	504659	4980668	COORDINATE
569782	PRUDHOMME, GEORGE T. & ANTOINETT	2618 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BCCABA	SEALED	DOMESTIC	240	225	OSPC	WEL	504542	4981475	COORDINATE
569978	RODRIGUEZ, THOMAS	2580 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BCCBDD	ACTIVE	DOMESTIC	216	170	OSTP	WEL	504491	4981388	COORDINATE
569982	FOSTER, KEVIN C. & BRENDA L.	2655 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BCACBB	SEALED	DOMESTIC	216	170	OSTP	WEL	504617	4981573	COORDINATE
572608	OAKDALE 8	HILO AV	OAKDALE	MN	29	21W	20	ABADCC	ACTIVE	PUBLIC SUPPLY	463	381	CJDN	WEL	503925	4981887	COORDINATE
575072	CASWELL JEFFREY K. & VICTORIA	8006 22ND CT N	LAKE ELMO	MN	29	21W	21	CCBDDD	ACTIVE	DOMESTIC	215	157	OSTP	WEL	504592	4980691	COORDINATE
575148	LESSARD, DAVID J. & MICHELLE L.	2890 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BBCBCA	ACTIVE	DOMESTIC	220	182	OSPC	WEL	504453	4981814	COORDINATE
576160	HERZOG, JAMES R. & JODY L.	2841 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BBACCA	ACTIVE	DOMESTIC	191	154	OSTP	WEL	504640	4981906	COORDINATE
577036	YANG, PAO & TIA	8119 26TH ST N	LAKE ELMO	MN	29	21W	21	BCDBCC	ACTIVE	DOMESTIC	216	168	OSTP	WEL	504610	4981382	COORDINATE
585145	BODEN, GLENN J. & IRENE M.	2895 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BBBDDB	ACTIVE	DOMESTIC	220	205	OPDC	WEL	504573	4981918	COORDINATE
587179	IMATION	3500 HILO AV	OAKDALE	MN	29	21W	17		ACTIVE	ELEVATOR	46	48		WEL	503606	4982879	ADDRESS
587407	ODOM, LISA M. & ANOTHONY L. WINCZE	8074 22ND CT N	LAKE ELMO	MN	29	21W	21	CCABCC	ACTIVE	DOMESTIC	220	173	OSTP	WEL	504623	4980767	COORDINATE
588139	RAUTION CLARENCE A. & PATRICIA A.	2850 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BBCAAA	ACTIVE	DOMESTIC	220	205	OPDC	WEL	504584	4981852	COORDINATE
589227	OAKDALE DEVELOPEMENT CORP	OAKDALE CROSS	OAKDALE	MN	29	21W	32	BBD	UNKNOWN	MONITORING	31	21		WEL	503101	4978564	ADDRESS
590079	KORY L. & MAUREEN C. NEISES LIV	8042 22ND CT N	LAKE ELMO	MN	29	21W	21	CCBADD	ACTIVE	DOMESTIC	240	220	OSTP	WEL	504594	4980803	COORDINATE
598818	WAGNER, JEFFREY T. & JULIE A.	8215 26TH ST N	LAKE ELMO	MN	29	21W	21	BCDACD	ACTIVE	DOMESTIC	216	168	OSTP	WEL	504748	4981387	COORDINATE
598819	O'MALLEY FAMILY REV LIVE TRUST	2811 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BBDBAA	ACTIVE	DOMESTIC	200	168	OSTP	WEL	504697	4981867	COORDINATE
599954	PETERSON, BRUCE & NORMA JEAN	8028 22ND CT N	LAKE ELMO	MN	29	21W	21	CCBDBB	ACTIVE	DOMESTIC	280	245	OPDC	WEL	504522	4980767	COORDINATE
606937	GREENGARD, JAMES & PAULETTE	2677 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BCAABB	ACTIVE	DOMESTIC	200	147	OSTP	WEL	504710	4981657	COORDINATE
607488	RICHERT, RAYMOND A. & PAMELA D.	2678 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BCBAAC	ACTIVE	DOMESTIC	240	222	OSPC	WEL	504577	4981627	COORDINATE
609537	KLETON, KENNNETH C. & MARCELA M.	2760 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BBDBCD	ACTIVE	DOMESTIC	201	126	OSTP	WEL	504655	4981787	COORDINATE
611059	OAKDALE 9	68XX 15TH ST N	OAKDALE	MN	29	21W	30	ADCDBB	ACTIVE	PUBLIC SUPPLY	517	441	CJDN	WEL	502513	4979760	COORDINATE
614269	PIERCE, JULIE A. & TIMOTHY T.	2769 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BBDACA	ACTIVE	DOMESTIC	201	123	OSTP	WEL	504735	4981820	COORDINATE
616945	ROTH, DONALD & ANNE	8154 26TH ST N	LAKE ELMO	MN	29	21W	21	BCACCD	ACTIVE	DOMESTIC	231	160	OSTP	WEL	504643	4981496	COORDINATE
617699	FLEMING, PATRICK R. & MADELEINE	2696 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BBDCCC	ACTIVE	DOMESTIC	240	220	OPDC	WEL	504619	4981685	COORDINATE
620099	FOOD N FUEL - MW-3	7445 15TH ST N	OAKDALE	MN	29	21W	29	CAB	UNKNOWN	MONITORING	16	6		WEL	503537	4979644	ADDRESS

TABLE A-1: MAPPED GROUNDWATER WELLS, OAKDALE WELLHEAD PROTECTION PLAN INVENTORY

UNIQUE NUMBER	WELL NAME	ADDRESS	CITY	STATE	TOWN-SHIP	RANGE	SECTION	SUB-SECTION	RECORDED STATUS	WELL USE	WELL DEPTH (FEET)	CASING DEPTH (FEET)	AQUIFER	PCSI CODE	UTM E COORD	UTM N COORD	LOCATION METHOD
620100	FOOD N FUEL - MW-1	7445 15TH ST N	OAKDALE	MN	29	21W	29	CAB	UNKNOWN	MONITORING	17	7		WEL	503537	4979644	ADDRESS
624051	FOOD N FUEL - MW-2	7445 15TH ST N	OAKDALE	MN	29	21W	29	CAB	UNKNOWN	MONITORING	16	6		WEL	503537	4979644	ADDRESS
652406	MN/DOT	3485 HADLEY AV N	OAKDALE	MN	29	21W	17	CBBABC	ACTIVE	ELEVATOR	28	28		WEL	502912	4982834	COORDINATE
670763	LINIEWICZ, PHILIP A. MARCIA L.	8226 26TH ST N	LAKE ELMO	MN	29	21W	21	BCADCD	SEALED	DOMESTIC	260	230	OPDC	WEL	504747	4981482	COORDINATE
678196	DEUTSCH, SCOTT & MARY M.	2699 IMPERIAL AV N	LAKE ELMO	MN	29	21W	21	BBDDCA	ACTIVE	DOMESTIC	242	210	OPDC	WEL	504737	4981725	COORDINATE
686284	OAKDALE TW	1900 HADLEY AV	OAKDALE	MN	29	21W	17	BABBCC	ACTIVE	TEST WELL	470	255	OPCJ	WEL	503236	4983595	COORDINATE
686293	OAKDALE TH-1	1900 HADLEY AV N	OAKDALE	MN	29	21W	18	BCDBCC	ACTIVE	TEST WELL	518	297	OPCJ	WEL	501432	4982997	COORDINATE
686294	OAKDALE TH-2	1900 HADLEY AV	OAKDALE	MN	29	21W	7	CDDCBB	ACTIVE	TEST WELL	501	281	OPCJ	WEL	501816	4983783	COORDINATE
696670	CCF INC - RW-1	3355 HADLEY AV N	OAKDALE	MN	29	21W	17	AC	UNKNOWN	RM	27	7		WEL	502842	4982619	ADDRESS
696671	RW-2	3355 HADLEY AV N	OAKDALE	MN	29	21W	17	AC	UNKNOWN	RM	27	7		WEL	502842	4982619	ADDRESS
696672	CCF INC	3355 HADLEY AV N	OAKDALE	MN	29	21W	17	AC	UNKNOWN	MONITORING	27	7		WEL	502842	4982619	ADDRESS
696673	CCF INC	3355 HADLEY AV N	OAKDALE	MN	29	21W	17	AC	UNKNOWN	MONITORING	27	7		WEL	502842	4982619	ADDRESS
727752	RW-37		OAKDALE	MN	29	21W	18	DDD	ACTIVE	MONITORING	16	0		WEL	502699	4982165	ADDRESS
727753	RW-38		OAKDALE	MN	29	21W	18	DDD	ACTIVE	MONITORING	59	49		WEL	502699	4982165	ADDRESS
727754	MENARD, INC.	3205 HADLEY AV N	OAKDALE	MN	29	21W	17	CDB	ACTIVE	MONITORING	61	51		WEL	502975	4982345	ADDRESS
727755	MENARD, INC.	3205 HADLEY AV N	OAKDALE	MN	29	21W	17	CDB	ACTIVE	MONITORING	16	6		WEL	502975	4982345	ADDRESS
737653	MW PL-43	3205 HADLEY AV NE	OAKDALE	MN	29	21W	17	CC	ACTIVE	MONITORING	81	72		WEL	503000	4982266	ADDRESS
737654	MW SP-44	GRANADA AV	OAKDALE	MN	29	21W	19	BDADDC	ACTIVE	MONITORING	135	125	OSTP	WEL	501962	4981485	COORDINATE
737655	MW PC-45	GRANADA AV	OAKDALE	MN	29	21W	19	BDADDC	ACTIVE	MONITORING	295	285	OPDC	WEL	501958	4981485	COORDINATE
737656	MW PL-41	5 HY	OAKDALE	MN	29	21W	18	DD	ACTIVE	MONITORING	82	72		WEL	502600	4982268	ADDRESS
737657	MW SP-42	5 HY	OAKDALE	MN	29	21W	18	DD	ACTIVE	MONITORING	126	116		WEL	502600	4982268	ADDRESS
741722	MW #3	3355 HADLEY AV N	OAKDALE	MN	29	21W	17	CCA	ACTIVE	MONITORING	14	4		WEL	502844	4982588	ADDRESS
741723	MW #2	3355 HADLEY AV N	OAKDALE	MN	29	21W	17	CCA	ACTIVE	MONITORING	18	8		WEL	502844	4982588	ADDRESS
741724	MW #1	3355 HADLEY AV N	OAKDALE	MN	29	21W	17	CCA	ACTIVE	MONITORING	14	4		WEL	502844	4982588	ADDRESS
761336	RW-14	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	32	17		WEL	502600	4982268	ADDRESS
761337	RW-15	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	52	22		WEL	502600	4982268	ADDRESS
761338	RW-16	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	40	20		WEL	502600	4982268	ADDRESS
761339	RW-17	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	39	19		WEL	502600	4982268	ADDRESS
761340	RW-18	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	58	18		WEL	502600	4982268	ADDRESS
761341	RW-19	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	55	30		WEL	502600	4982268	ADDRESS
761342	RW-20	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	52	32		WEL	502600	4982268	ADDRESS
761343	RW-21	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	58	38		WEL	502600	4982268	ADDRESS
761344	RW-22	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	25	15		WEL	502600	4982268	ADDRESS
761345	RW-23	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	57	32		WEL	502600	4982268	ADDRESS
761346	RW-24	HWY 5 & HADLEY AVE LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	33	13		WEL	502600	4982268	ADDRESS
761347	RW-25	HWY 5 & HADLEY AV LM	OAKDALE	MN	29	21W	18	DD	ACTIVE	RM	61	21		WEL	502600	4982268	ADDRESS
763351	3M COMPANY	40TH ST N	OAKDALE	MN	29	21W	8	DCCADA	ACTIVE	MONITORING	427	221	OPDC	WEL	503807	4983819	COORDINATE
773389	OAKDALE 10	1584 HADLEY AV N	OAKDALE	MN	29	21W	7	CDDCCD	ACTIVE	PUBLIC SUPPLY	501	415	CJDN	WEL	501854	4983717	COORDINATE
785567	MW	HWY 5 & GRANADA LM	OAKDALE	MN	29	21W	18	DBB	ACTIVE	MONITORING	20	0		WEL	502106	4982783	ADDRESS
785568	MW	HWY 5 & GRANADA LM	OAKDALE	MN	29	21W	18	DBB	ACTIVE	MONITORING	25	0		WEL	502106	4982783	ADDRESS
785569	3M COMPANY	N/A SEE REMARKS	OAKDALE	MN	29	21W	18	DBB	UNKNOWN	RM	44	24		WEL	502106	4982783	ADDRESS
W0001044	TARGET CORPORATION	7900 32ND ST N	OAKDALE	MN	29	21W	17	DADDBD	UNKNOWN	-	0	0		WEL	504344	4982550	COORDINATE
W0001121	LESSARD, DAVID J. & MICHELLE L.	2890 IMPERIAL AV N	OAKDALE	MN	29	21W	21	BBCBCD	UNKNOWN	UNKNOWN	0	0		WEL	504438	4981782	COORDINATE
W0001130	CAROLINE M. EBERHARD TRUST			MN	29	21W	21	CADDAB	UNKNOWN	UNKNOWN	0	0		WEL	505165	4980981	COORDINATE

TABLE A-2: MAPPED STORAGE TANK SITES, OAKDALE WELLHEAD PROTECTION PLAN INVENTOR\`

MPCA ID	SITE NAME	MAILING ADDRESS	CITY	ZIP	STATUS	LOCATION METHOD	PCSI CODE	MATERIAL CODE	TANKS	UTM E COORD	UTM N COORD
55804	Oakdale Rental	3133 Hadley Ave N	Oakdale	55128	ACTIVE	Digitized - Map Tool	AST	F000	3	502910	4982184
122445	Mo-Tech Corp	2920 Granada Ave N	Oakdale	55128	ACTIVE	Address Matching House Number	AST	F000	1	501988	4981973
4335	Mndot Truck Station	3845 Hadley Ave N	Oakdale	55128	ACTIVE	Address Matching House Number	UST	F000	5	502901	4982904
4296	Oakdale Public Works Dept	1900 Hadley Ave N	Oakdale	55128	ACTIVE	Address Matching House Number	UST	F000	2	502787	4980458
4230	Ryder Student Transportation Services	6349 Stillwater Blvd N	Oakdale	55128	ACTIVE	Address Matching House Number	UST	F000	1	501682	4980752
10081	Oakdale Food & Fuel	7445 15th St N	Oakdale	55128	ACTIVE	Address Matching House Number	UST	F000	2	503545	4979668
53178	Former Crown Auto	3115 Hadley Ave	Oakdale	55128	ACTIVE	Digitized - Map Tool	AST	F000	1	502842	4982166
4233	Tartan Senior High School	828 Greenway Ave N	Oakdale	55128	ACTIVE	Address Matching House Number	UST	F000	1	502380	4978560
10263	Holiday Stationstore 441	2159 Division St N	North St. Paul	55109	ACTIVE	Digitized - Map Tool	UST	F000	2	501131	4983646
54859	Oakdale Lift Station L-11	2847 Granada Ave N	Oakdale	55128	ACTIVE	Address Matching House Number	AST	F000	1	502002	4981802
4149	Holiday Stationstore #352	1025 Hadley Ave	Oakdale	55128	ACTIVE	Digitized - Map Tool	UST	F000	4	502855	4978923
21061	Kwik Trip #869	3355 Hadley Ave	Oakdale	55128	ACTIVE	Address Matching House Number	UST	F000	4	502804	4982619
19399	Holiday Stationstore	3344 Hadley Ave N	Oakdale	55128	ACTIVE	Address Matching House Number	UST	F000	4	502791	4982650
51204	Oakdale Bulk Plant	7261 Stillwater Blvd N	Oakdale	55128	ACTIVE	Digitized - Map Tool	AST	F000	10	503230	4981608
126268	Hy-Vee Gas	7180 10th St N	Oakdale	55128	ACTIVE	ADDRESS	UST	F000	2	502957	4978929
126383	SuperAmerica	7630 33rd St N	Oakdale	55128	ACTIVE	ADDRESS	UST	F000	3	503895	4982604
4296	Oakdale Public Works Dept	1900 Hadley Ave N	Oakdale	55128	ACTIVE	Address Matching House Number	AST	F000	1	502787	4980458
4335	Mndot Truck Station	3845 Hadley Ave N	Oakdale	55128	ACTIVE	Address Matching House Number	AST	F000	3	502901	4982904
4230	Ryder Student Transportation Services	6349 Stillwater Blvd N	Oakdale	55128	ACTIVE	Address Matching House Number	AST	F000	1	501682	4980752

Z:\Oakdale\Part 2 Plan Update\Part 2 Report Files\[Inventory Tables - Oakdale 3.xlsx]TANK TABLE

TABLE A-3: DOCUMENTED SPILL AND LEAK SITES, OAKDALE WELLHEAD PROTECTION PLAN INVENTOR

MPCA ID	SITE NAME	MAILING ADDRESS	CITY	ZIP	STATUS	ACTIVITY	LOCATION METHOD	PCSI CODE	UTM E COORD	UTM N COORD
17532	Red Oak Preserve	4980 Hamlet Ave N	Oakdale	55128	ACTIVE	Leak Site	Digitized - Map Tool	SPL	502930	4985187
19730	Koch Pipeline - Mile Post 238	See location description	Oakdale	55128	INACTIVE	Leak Site	Digitized - Map Tool	SPL	503596	4981926
11910	Mndot Truck Station	3845 Hadley Ave N	Oakdale	55128	INACTIVE	Multiple Activities	Address Matching House Number	SPL	502902	4982910
13666	Grzywinski Residence	6391 Kings Dr	Oakdale	55128	INACTIVE	Leak Site	Address Matching House Number	SPL	501814	4984049
11437	Ryder Student Transportation Services	6349 Stillwater Blvd N	Oakdale	55128	INACTIVE	Multiple Activities	Address Matching House Number	SPL	501682	4980752
11583	Oakdale Food & Fuel	7445 15th St N	Oakdale	55128	INACTIVE	Multiple Activities	Address Matching House Number	SPL	503535	4979659
16968	Former Crown Auto	3115 Hadley Ave	Oakdale	55128	ACTIVE	Multiple Activities	Digitized - Map Tool	SPL	502842	4982166
15730	Tartan Senior High School	828 Greenway Ave N	Oakdale	55128	INACTIVE	Multiple Activities	Address Matching House Number	SPL	502380	4978560
17199	Bob Hackney Property	7383 Stillwater Blvd N	Oakdale	55128	ACTIVE	Leak Site	Digitized - Map Tool	SPL	503433	4981757
MN0001118942	Hadley & 15th Street Dump	See location description	Oakdale	55128	INACTIVE	CERCLIS Site	Digitized-DRG	CERCL	502747	4979809
11818	Holiday Stationstore 441	2159 Division St N	North St. Paul	55109	INACTIVE	Multiple Activities	Digitized - Map Tool	SPL	501131	4983646
15873	Holiday Stationstore #352	1025 Hadley Ave	Oakdale	55128	INACTIVE	Multiple Activities	Digitized - Map Tool	SPL	502855	4978923
3745	Briar Pond Apartments	1591 Granada Ave N	Oakdale	55128	INACTIVE	Petroleum Brownfield	Address Matching House Number	BMS	502215	4979895
15266	Kwik Trip #869	3355 Hadley Ave	Oakdale	55128	INACTIVE	Multiple Activities	Address Matching House Number	SPL	502804	4982619
991	Ryder Student Transportation Services	6349 Stillwater Blvd	Oakdale	55128	INACTIVE	Leak Site	Address Matching House Number	SPL	501682	4980752
1362	Mn Dept Of Transportation	3485 Hadley Ave N	Oakdale	55128	INACTIVE	Leak Site	Address Matching House Number	SPL	502804	4982796
11098	Mathews Residence	2766 Gresham Ave N	Oakdale	55128	INACTIVE	Leak Site	Address Matching House Number	SPL	502449	4981545
16989	Kopeska Property	4715 Glenbrook Ave N	Oakdale	55128	INACTIVE	Multiple Activities	Digitized - Map Tool	SPL	501680	4984772
3266	Tartan Senior High School	828 Greenway Ave N	Oakdale	55128	INACTIVE	Multiple Activities	Address Matching House Number	BMS	502380	4978560
4383	Kwik Trip #869	3355 Hadley Ave	Oakdale	55128	INACTIVE	Multiple Activities	Address Matching House Number	BMS	502804	4982619
4605	Mndot Truck Station	3845 Hadley Ave N	Oakdale	55128	INACTIVE	Multiple Activities	Address Matching House Number	SPL	502902	4982910

Z:\Oakdale\Part 2 Plan Update\Part 2 Report Files\[Inventory Tables - Oakdale 3.xlsx]LEAK TABLE

APPENDIX B

CITY OF OAKDALE
CONSUMER CONFIDENCE REPORT

CITY OF OAKDALE

2015 DRINKING WATER REPORT

◆OAKDALE PUBLIC WORKS◆
◆1900 HADLEY AVENUE◆OAKDALE◆MN◆55128◆
◆(651) 730-2740◆

CONSUMER CONFIDENCE REPORT

PWSID: 1820016

City of Oakdale

2015 Drinking Water Report

The City of Oakdale is issuing the results of monitoring done on its drinking water for the period from January 1 to December 31, 2015. The purpose of this report is to advance consumers' understanding of drinking water and heighten awareness of the need to protect precious water resources.

Source of Water

The City of Oakdale provides drinking water to its residents from a groundwater source: eight wells ranging from 463 to 581 feet deep, that draw water from the Jordan aquifer.

The Minnesota Department of Health has made a determination as to how vulnerable our systems' source(s) of water may be to future contamination incidents. If you wish to obtain the entire source water assessment regarding your drinking water, please call 651-201-4700 or 1-800-818-9318 (and press 5) during normal business hours. Also, you can view it on line at www.health.state.mn.us/divs/eh/water/swp/swa.

Call 651-730-2740 if you have questions about the City of Oakdale drinking water or would like information about opportunities for public participation in decisions that may affect the quality of the water.

Results of Monitoring

No contaminants were detected at levels that violated federal drinking water standards. However, some contaminants were detected in trace amounts that were below legal limits. The table that follows shows the contaminants that were detected in trace amounts last year. (Some contaminants are sampled less frequently than once a year; as a result, not all contaminants were sampled for in 2015. If any of these contaminants were detected the last time they were sampled for, they are included in the table along with the date that the detection occurred.)

Key to abbreviations:
MCLG─Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MCL─Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MRDL─Maximum Residual Disinfectant Level.

MRDLG─Maximum Residual Disinfectant Level Goal.

AL─Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirement which a water system must follow.

90th Percentile Level─This is the value obtained after disregarding 10 percent of the samples taken that had the highest levels. (For example, in a situation in which 10 samples were taken, the 90th percentile level is determined by disregarding the highest result, which represents 10 percent of the samples.) Note: In situations in which only 5 samples are taken, the average of the two with the highest levels is taken to determine the 90th percentile level.

PWSID: 1820016

ppm─Parts per million, which can also be expressed as milligrams per liter (mg/l).

ppb─Parts per billion, which can also be expressed as micrograms per liter (µg/l).

nd─No Detection.

N/A─Not Applicable (does not apply).

Contaminant (units)	MCLG	MCL	Level Found		Typical Source of Contaminant
			Range (2015)	Average /Result*	
Barium (ppm)	2	2	N/A	.02	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Fluoride (ppm)	4	4	1-1.3	1.28	State of Minnesota requires all municipal water systems to add fluoride to the drinking water to promote strong teeth; Erosion of natural deposits; Discharge from fertilizer and aluminum factories.
Haloacetic Acids (HAA5) (ppb)	0	60	1.1-5.8	5.8	By-product of drinking water disinfection.
Nitrate (as Nitrogen) (ppm)	10.4	10.4	nd-2.5	2.5	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
TTHM (Total trihalomethanes) (ppb)	0	80	2.9-15.5	15.5	By-product of drinking water disinfection.

*This is the value used to determine compliance with federal standards. It sometimes is the highest value detected and sometimes is an average of all the detected values. If it is an average, it may contain sampling results from the previous year.

Contaminant (units)	MRDLG	MRDL	****	*****	Typical Source of Contaminant
Chlorine (ppm)	4	4	.2-.3	.25	Water additive used to control microbes.

****Highest and Lowest Monthly Average.
*****Highest Quarterly Average.

Contaminant (units)	MCLG	AL	90% Level	# sites over AL	Typical Source of Contaminant
Copper (ppm) (09/09/2013)	1.3	1.3	.1	0 out of 32	Corrosion of household plumbing systems; Erosion of natural deposits.
Lead (ppb) (09/09/2013)	0	15	3.5	0 out of 32	Corrosion of household plumbing systems; Erosion of natural deposits.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and

home plumbing. City of Oakdale is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Monitoring may have been done for additional contaminants that do not have MCLs established for them and are not required to be monitored under the Safe Drinking Water Act. Results may be available by calling 651-201-4700 or 1-800-818-9318 during normal business hours.

Monitoring for unregulated contaminants as required by U.S. Environmental Protection Agency rules (40 CFR 141.40) was conducted in 2015. Results of the unregulated contaminant monitoring are available upon request from Cindy Swanson, Minnesota Department of Health, at 651/201-4656.

Compliance with National Primary Drinking Water Regulations

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

Inorganic contaminants, such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.

Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (EPA) prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly,

and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline at 1-800-426-4791.

PFC Factsheet

What are Perfluorochemicals (PFCs)?
PFCs were made by the 3M Company in Cottage Grove and in other areas of the world. These chemicals were used in household and industrial products such as stain repellents, lubricants, fire retardants, fire suppressants and pesticides. Two of the most common uses of PFCs found in the home are the products Teflon and Scotchguard. Three types of PFCs have contaminated east metro water systems, as well as Lake Calhoun and other metro area lakes. They are perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and perfluorobutanoic acid (PFBA).

Why are there concerns about PFCs?
While the level of water contamination is considered "low," there is concern about whether any level of exposure to PFCs is safe. A U.S. EPA Science Advisory Board (SAB) animal study found health effects at even the lowest PFOA blood levels. The SAB also classified PFOA as a likely human carcinogen. As a result of environmental and health concerns, 3M stopped production of Scotchguard in 2000 and ceased PFOA production at its Cottage Grove Plant. In high dose animal studies, PFOS and PFOA cause cancer, physical development delays, endocrine disruption and neonatal mortality. Much less is known about health effects from PFBA because it has not been studied extensively.

What is causing the contamination?
The suspected sources of contamination are 3M's production plant in Cottage Grove and landfills where 3M disposed of PFCs. However, the discovery of dangerously high levels of PFCs in bluegill fish in Lake Calhoun raises questions as to how the pollution became so widespread.

Who is affected by this problem?
Approximately 67,700 residents served by city water in Cottage Grove, St. Paul Park, Oakdale and private wells in Lake Elmo are affected by the pollution. Additionally, anyone who eats fish from of the Chain of Lakes in Minneapolis or from the Mississippi River risks exposure to PFC contamination. A 3M chemical also has been detected in Woodbury, Newport, Hastings and South St. Paul. Three landfills in St. Paul, Inver Grove Heights and Rosemont also have high PFC concentrations. The effects on groundwater near these sites will be clarified through further testing.

What should I do to avoid health risks?
Water filters containing Granular Activated Carbon (GAC) remove some PFCs. Many common water filters use GAC. You should be sure that these filters are properly installed and maintained. Bottled water has not been widely tested for PFCs and boiling water will not remove PFCs. Visit the Minnesota Department of Health web site to view their report on which filtration systems are most effective for PFC removal.

What is being done about the contamination?
New PFC drinking water standards were mandated by the Minnesota Legislature and set by the Minnesota Department of Health. The current standards are .5 ppb for PFOA, .3 ppb for PFOS and 7ppb for PFBA. This is the amount of PFC considered safe to consume in drinking water. The Minnesota Pollution Control Agency (MPCA) reached an agreement with 3M that provides $8 million to clean up PFCs in the Washington County Landfill, provides $5 million to MPCA for research on PFCs in the environment, provides alternate drinking water where PFCs exceed state HRLs and removes PFC waste from three former disposal sites to store in a lined facility or incinerate.

Is Minnesota the only state with PFC contamination?
No, seven other states -- New Jersey, Virginia, West Virginia, Ohio, Alabama, North Carolina and New York- have experienced PFC water contamination. In New Jersey, Virginia, West Virginia and North Carolina the contamination is from four DuPont plants that manufacture or continue to use PFOA. A 3M plant in Decatur is associated with the contamination in Alabama.

How have other contaminated communities responded?
Some community residents have filed class action lawsuits against DuPont and 3M. In Ohio and West Virginia, residents reached an out of court settlement that provides treatment systems for all affected public water supplies, installs carbon filtration systems on private wells and conducts community health evaluations to determine if there is a link between PFC exposure and disease. The data from the community health evaluations will be reviewed by an independent panel of experts. If the expert panel determines there is a link between PFC exposure and disease, a medical monitoring program will be established. In New Jersey and Virginia, environmental groups and unions are working together to fight for safe drinking water, contamination clean up, medical monitoring and the quick phase out of PFOA production. In early 2007, the New Jersey Department of Environmental Protection set the drinking water guidance level for PFOA at .04 ppb, making it the lowest in the nation. This is more than ten times lower - thus more protective - than the current Minnesota standard.

APPENDIX C

WATER SUPPLY CONTINGENCY PLAN APPROVAL DOCUMENTATION

Minnesota Department of Natural Resources

DNR Waters, 1200 Warner Road, St. Paul, MN 55106
Telephone: (651) 259-5845 Fax: (651) 772-7977

December 31, 2009

City of Oakdale
Chris Sonterre, Utility Superintendent
1900 Hadley Ave North
Oakdale, MN 55128

RE: Water Supply Plan Approval, Permit #1978-6197, City of Oakdale, Washington County

Dear Mr. Sonterre:

Our office has completed the review of your Water Supply Plan (formerly called Water Emergency and Conservation Plan) for public water supply authorized under DNR Water Appropriation Permit 1978-6197. I am pleased to advise you that in accordance with *Minnesota Statutes*, Section 103G.291, Subdivision 3, and on behalf of the Commissioner of Natural Resources, I hereby approve your Plan. This approval is effective upon the Department's receipt of a completed copy of the attached "Certification of Adoption" form. **Please return the form to my office as soon as the City officially adopts the Plan.**

The City's calculated average residential per capita demand per day is 79 gallons/day, which is higher than the 2002 metropolitan average of 75 gallons/day. Also, the City's peak demand ratio of 3.04 exceeds the peak demand ratio of 2.6. The City has described goals to both reduce residential demands and lower peak demands in the Water Conservation Plan. The DNR and Metropolitan Council encourage the City to continue educating its customers on how they can reduce household water use. For more information on water conservation programs please see the Council's water conservation toolbox at:
http://www.metrocouncil.org/environment/Watersupply/conservationtoolbox_programs.htm

We do recommend that the City of Oakdale drill a wellfield observation well within the general area shown in the attached figure 1. The City should contact either Area Hydrologist Craig Wills, or Hydrogeologist Evan Drivas, Groundwater Unit, for specific details. Monitoring would include multiple daily readings with a transducer and data logger, along with monthly hand measurements of static water levels for transducer calibration.

Thank you for your efforts in planning for the future of the City of Oakdale's water supply and for conserving the water resources of the State of Minnesota. If you have any questions or need additional assistance with the City's water appropriation permit, please contact Area Hydrologist Craig Wills at 651-259-5757.

Sincerely,

Dale E. Homuth
Regional Hydrologist

Enclosures (2)

- Certificate of Adoption form
- Figure 1. Wellfield observation well map

ec:

Metropolitan Council, Sara Smith
Ramsey-Washington Conservation District, Cliff Aichinger
Valley Branch WD, John Hanson
Washington Conservation District, Jay Riggs
DNR Water Appropriation Program, Laurel Reeves
DNR Ground Water Unit, Evan Drivas
DNR Ground Water Monitoring Coord., Mike MacDonald
DNR Area Hydrologist, Craig Wills
DNR Central Office SWUDS

Wills, Craig (DNR)

From: Homuth, Dale (DNR)
Sent: Wednesday, February 10, 2010 9:13 AM
To: Brian Bachmeier
Cc: Wills, Craig (DNR)
Subject: RE: Oakdale Water Supply Plan Certification of Adoption

Hi Brian;
I am in receipt of Oakdale's certification of adoption of your Water supply plan. The process is completed.
Congratulations, and thanks for your help on this matter.
-Dale

Dale E. Homuth
Regional Waters Manager
Central Region Waters
1200 Warner Road
St. Paul, MN 55106
Phone: 651-259-5766
fax: 651-772-7977
email= dale.homuth@state.mn.us
website= www.dnr.state.mn.us

-----Original Message-----
From: Brian Bachmeier [mailto:brian.bachmeier@ci.oakdale.mn.us]
Sent: Wednesday, February 10, 2010 8:59 AM
To: Homuth, Dale (DNR)
Subject: Oakdale Water Supply Plan Certification of Adoption

Dale,

City Council approved our plan at last nights council meeting.

Brian Bachmeier, P.E.
Public Works Director/City Engineer
City of Oakdale
1584 Hadley Ave North
Oakdale, MN 55128
651.730.2730 office
651.730-2820 fax

CERTIFICATION OF ADOPTION
WATER SUPPLY PLAN

City or Water System Name: City of Oakdale

Name of Person Authorized to Sign Certification on Behalf of the System: Brian Bachmeier

Title: Public Works Director / City Engineer

Address: 1584 Hadley Ave N, Oakdale Mn 55128

Telephone: 651-730-2730 Fax: 651-730-2820

E-mail: brian.bachmeier@ci.oakdale.mn.us

I certify that the Water Supply Plan approved by the Department of Natural Resources has been adopted by the city council or utility board that has authority over water supply services.

Signed:  Date: 2/10/10

Fax (651/772-7977) or mail this certification to: **DNR Waters**
1200 Warner Road
St. Paul, MN 55106

Or, scan and email to: dale.homuth@state.mn.us

APPENDIX D

CORRESPONDENCE

MINNESOTA MDH DEPARTMENT OF HEALTH

COPY

February 16, 2016

Protecting, maintaining and improving the health of all Minnesotans

Mr. Brian Bachmeier, Public Works Director
City of Oakdale
1584 Hadley Avenue North
Oakdale, Minnesota 55128

Dear Mr. Bachmeier:

Subject: Scoping 2 Decision Notice and Meeting Summary – City of Oakdale – PWSID 1820016

This letter provides notice of the results of the second scoping meeting held with you, Mark Janovec (Stantec) and myself on February 5, 2016, at Oakdale City Hall regarding Part II of your wellhead protection (WHP) plan. During the meeting, we discussed data elements that must be compiled and assessed 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 data elements must be compiled and assessed in terms of their present and future implications on the 1) use of the well(s), 2) quality and quantity of water supplying the public water supply well(s), and 3) land and groundwater uses in the drinking water supply management area. We also discussed a summary of planning issues that were identified during the Part I WHP Plan development process which should be considered for inclusion in your Part II WHP Plan.

The city of Oakdale has met the requirements to distribute copies of the first part of the WHP plan to local units of government and hold an informational meeting for the public. The city of Oakdale will have until April 1, 2017, to complete its WHP 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. MDH understands Stantec will be working with you to develop a draft of the remainder of the WHP 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 john.freitag@state.mn.us or by phone at (651) 201-4669.

Sincerely,

John Freitag, Planner
Source Water Protection Unit
Environment Health Division
P.O. Box 64975
St. Paul, Minnesota 55164-0975

JF:ds-b
Enclosures
cc: Marc Janovec, Stantec
Lucas Martin, MDH Engineer, Metro District Office
Ron Struss, Minnesota Department of Agriculture

SCOPING 2 DECISION NOTICE
Moderately Vulnerable DWSMA

Remainder of the Wellhead Protection Plan

Name of Public Water Supply:		**Date:**
City of Oakdale **PWSID 1820016**		February 16, 2016
Name of the Wellhead Protection Manager:		
Mr. Brian Bachmeier, Public Works Director		
Address:	**City:**	**Zip:**
1548 Hadley Avenue North	Oakdale	55128
Unique Well Numbers:		**Phone:**
208462 (Well 1), 208463 (Well 2), 208454 (Well 3), 127287 (Well 5), 463534 (Well 7), 572608 (Well 8), 611059 (Well 9), 773389 (Well 10)		(651) 730-2730

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.

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 the geology of the area(s).

N	R	S	
	X		Existing surface geophysical studies.

Technical Assistance Comments: The management of all the Drinking Water Supply Management Area(s) must reflect the geology of the area(s).

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 Areas(s) must reflect what is known about these data elements, as follows:

Moderate Vulnerability - 1) All potential contaminant sources 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 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.

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: 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	An existing map of storm sewers, sanitary sewers, and public water supply systems.

Technical Assistance Comments: It is not necessary to include a map of your public water supply system in your plan if you feel it would pose a threat to the security of your system. An existing map of the storm sewers and sanitary sewers in the Drinking Water Supply Management Area(s) must be included in the wellhead protection plan and must also be submitted to MDH as part of the approval.

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

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 map or list of public drainage systems.

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 record of construction, maintenance, and use of the public water supply well 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 this data element.

N	R	S	
	X	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 this data element.

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: 1. bacteriological contamination indicators; 2. inorganic chemicals; 3. organic chemicals; 4. sedimentation; 5. dissolved oxygen; and 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 this data element.

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 this data element.

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.

Scoping 2 Meeting
Wellhead Protection (WHP) Planning Issues Summary
PWSID: 1820016 – Oakdale

DWSMA Vulnerability:

☐ *Very Low* ☐ *Low* ☒ *Moderate* ☐ *High* ☐ *Very High*

Drinking Water Protection Issues Identified to Date:

☒ The clay-rich geologic materials covering the aquifer are thin, discontinuous, or leaky.

Water Quality Detections and Implications:

☒ The detection of tritium indicates some city wells captures young (post-1953) recharge indicating that the aquifer is dominated by young recharge.

The concentrations of PFCs at Oakdale Wells 5 and 9 were high enough that a water filtration plant was built to reduce PFC levels in the city's drinking water supply.

Old Municipal Well Information:

☒ The Minnesota Department of Health has compiled historical information for use in the planning process.

Sanborn Maps:

☐ Sanborn Maps are available for this area

☒ Sanborn Maps are not available for this area

Recommended WHP Measures:

☒ Consult with area hydrologist.

Primary Oakdale Wells 1, 8, and 9 have not been tested for tritium to date. While other data (including PFC contamination) would suggest the Jordan Aquifer is somewhat vulnerable in the areas surrounding these wells, it is recommended that future tritium testing be conducted on wells that have not been tested to date.

Continue collecting groundwater samples for analysis of regulated contaminants and provide the data to MDH.

Evaluate if storm water infiltration is a concern, particularly in the one year time-of-travel.

This document is intended to be a summary of issues identified to date and is ***not intended to replace the required data elements identified in the Scoping 2 Decision Notice*** *nor is it intended to be an exhaustive list of all potential drinking water issues.*

City of Oakdale

1584 Hadley Avenue North, Oakdale, MN 55128
(651) 739-5086 www.ci.oakdale.mn.us

Date: January 9, 2017

To: Clark Schroeder
3800 Laverne Ave. No.
Lake Elmo, MN 55042

Re: City of Oakdale - Part 2 Wellhead Protection Plan

The City of Oakdale is supplying this draft Wellhead Protection Plan to neighboring and overlapping local units of government, as required by Minnesota Wellhead Protection Rule, part 4720.5350, subpart 1. The goal of Oakdale's Wellhead Protection Plan is to protect all who use the water supply from adverse health effects associated with groundwater contamination.

According the Minnesota Wellhead Protection Rule 4720.5350, subpart 2; local units of government have 60 days to review and comment on the plan. We ask that you provide any comments you may have on or before March 24, 2017. Please use this address when providing comments:

Brian Bachmeier
City of Oakdale
1584 Hadley Avenue North
Oakdale, MN 55128

The draft report has been provided on the attached CD-ROM and can be read using freely available Adobe Acrobat (PDF) software. If you have trouble viewing the report files, please contact Mark Janovec at Stantec for assistance at (651) 604-4831.

The City of Oakdale will also be holding a public hearing on Tuesday, March 28 at 7:00pm as part of the City Council meeting (1584 Hadley Avenue) and will invite comments from the public regarding the Wellhead Protection Plan. If you wish to attend and provide your comments at that time, you are invited to do so.

Thank you for your assistance with our wellhead protection efforts.

Sincerely,

Brian Bachmeier, P.E.
Public Works Director/City Engineer

Cc: Trudi Witkowski, Minnesota Department of Health
Mark Janovec, Stantec

January 24, 2017

Brian Bachmeier, Wellhead Protection Manager
City of Oakdale
1584 Hadley Avenue North
Oakdale, MN 55128

RE: Oakdale Wellhead Protection Plan, Part 2
Metropolitan Council District 11
Referral File No. 21468-2

Dear Mr. Bachmeier:

Thank you for submitting Part 2 of the city of Oakdale wellhead protection plan (WHPP). Metropolitan Council (Council) staff review completed plans under the provisions of Minnesota Rules, Chapter 4720.

The Council evaluates wellhead protection plans in comparison with information reported in the Council's Master Water Supply Plan, including: population and water demand information, predicted issues associated with water supply development, and identified opportunities for inter-jurisdictional cooperation. This wellhead protection plan provides a good overview of the supply source and measures to protect it. Council staff offer the following comments to highlight how the plan could be made even stronger.

The city of Oakdale WHPP contains excellent information and demonstrates a significant understanding of WHP issues. The extension of the city's WHPP into the neighboring communities of North St. Paul and Lake Elmo creates an opportunity for collaboration in wellhead protection implementation. The city may want to consider the formation of a wellhead protection (WHP) coordinating committee with DWSMA-overlapping governmental units, as well as the Ramsey-Washington Watershed District, as a way to facilitate communication and drinking water protection planning activities. This group would support the opportunity identified in chapter 7.2, and could aid wellhead protection managers in their efforts to identify problems, share information, and communicate WHP planning activities.

The city could also consider adding 'success criteria' to each WHP action presented in Chapter 8. This would support the city's plan implementation evaluation program, and could be included in the wellhead protection progress report. Some examples that would strengthen both the WHPP and support the city's Water Supply Plan include: maintaining average daily residential per capita demand at or below the metropolitan average of 75 gallons per day, maintaining the city's average maximum day to average day ratio at or below the metropolitan average of 2.6, reducing unaccounted water use to the American Water Works Association recommendation of 10% or less, recording the number of residents referred to the MDH Well Owner's Handbook, tracking the number of wells identified and sealed based on official city building records, etc.

The integration of the WHPP with the city's planning process is a critical task in strengthening groundwater protection. There are a number of resources available to communities to aid in the wellhead and source water planning and protection effort. Some examples include:

- 2015 Oakdale Systems Statement
- 2015 Master Water Supply Plan
- Water Conservation Toolbox
- Stormwater Reuse Guide
- Metropolitan Council 2010 Report: Evaluation of Groundwater and Surface-Water Interaction: Guidance for Resource Assessment
- The Minnesota Technical Assistance Program
- Thrive MSP 2040 Regional Plan

Please let me know if you are interested in learning more about these tools or any other resources.

This letter completes the Council's review process. On behalf of the Council, I thank you for your efforts in preparing this plan. Please send us a copy of the finalized WHPP, if any revisions are made. Should any questions arise on the Council's review comments, please feel free to contact John Clark of the Council's Environmental Services Division at (651) 602-1452 or johnd.clark@metc.state.mn.us.

Sincerely,

Sam Paske
Assistant General Manager, Environmental Quality Assurance

cc: Sandy Rummel, Metropolitan Council Member, District 11
Ryan Garcia, Metropolitan Council Sector Representative
John Freitag, Minnesota Department of Health

APPENDIX E

IWMZ INVENTORY

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	1820016 **COMMUNITY**
NAME	Oakdale
ADDRESS	Oakdale Water Superintendent, 1900 Hadley Avenue North, Oakdale, MN 551285407

FACILITY (WELL) INFORMATION

NAME	Well #1
FACILITY ID	S01
UNIQUE WELL NO.	208462
COUNTY	Washington

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1820016 S01	**UNIQUE WELL NO.**	208462

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		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		

PWS ID / FACILITY ID	1820016 S01	UNIQUE WELL NO.	208462

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				
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		Y	180	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		Y	50	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.		N		
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		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		

PWS ID / FACILITY ID	1820016 S01	UNIQUE WELL NO.	208462

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				
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).							
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.

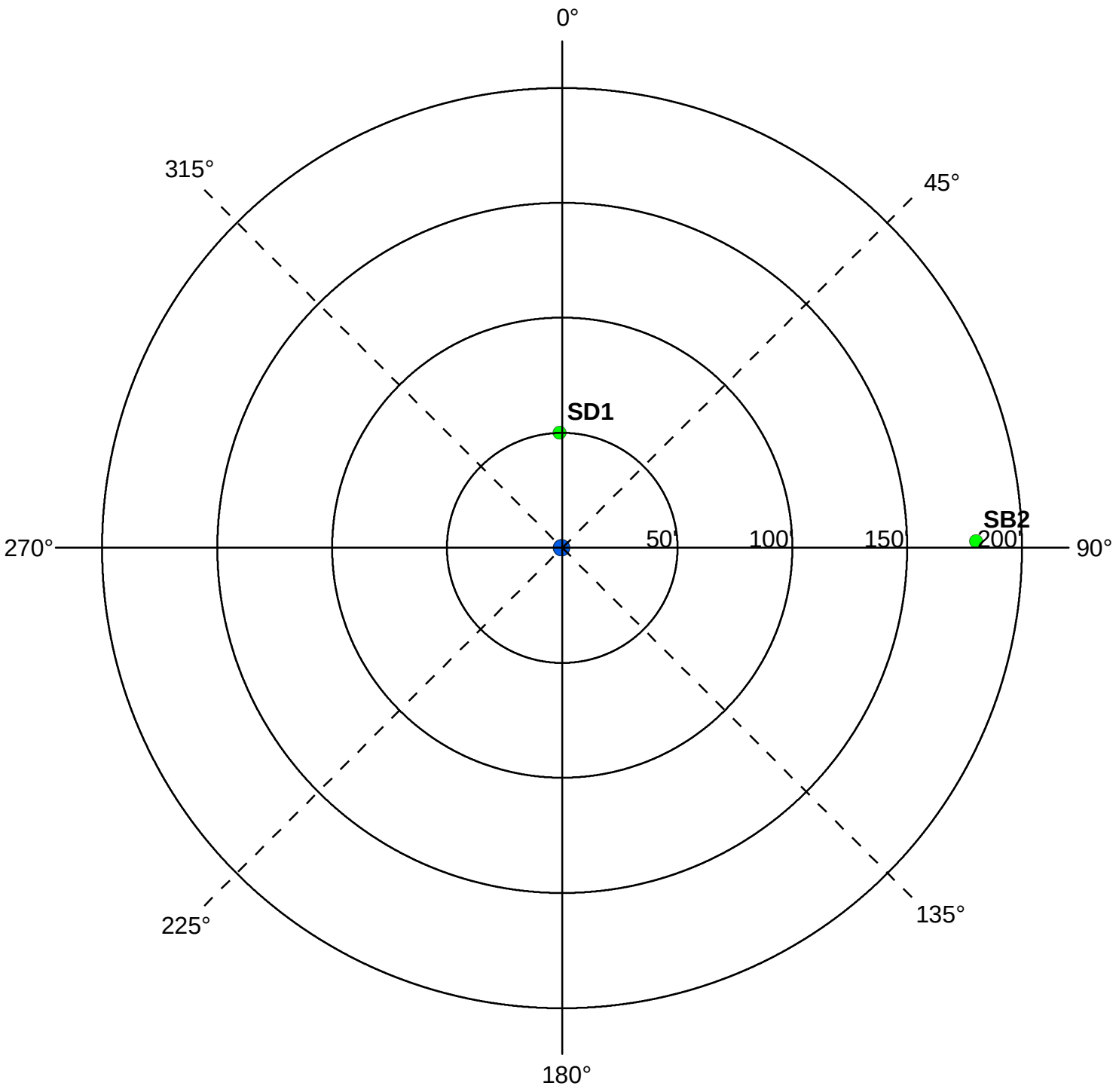
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1820016 S01	UNIQUE WELL NO.	208462

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.



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

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

INSPECTOR	Freitag, John	DATE	7 - 29 - 2013

PWS ID / FACILITY ID	1820016 S01	UNIQUE WELL NO.	208462

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

COMMENTS

9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 12/22/1998) 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	1820016	**COMMUNITY**
NAME	Oakdale	
ADDRESS	Oakdale Water Superintendent, 1900 Hadley Avenue North, Oakdale, MN 551285407	

FACILITY (WELL) INFORMATION

NAME	Well #2
FACILITY ID	S02
UNIQUE WELL NO.	208463
COUNTY	Washington

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1820016 S02	**UNIQUE WELL NO.**	208463

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		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		

PWS ID / FACILITY ID	1820016 S02	UNIQUE WELL NO.	208463

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				
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		Y	76	N
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	86	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		Y	71	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.		N		
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		Y	85	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	1820016 S02	UNIQUE WELL NO.	208463

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).							
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.

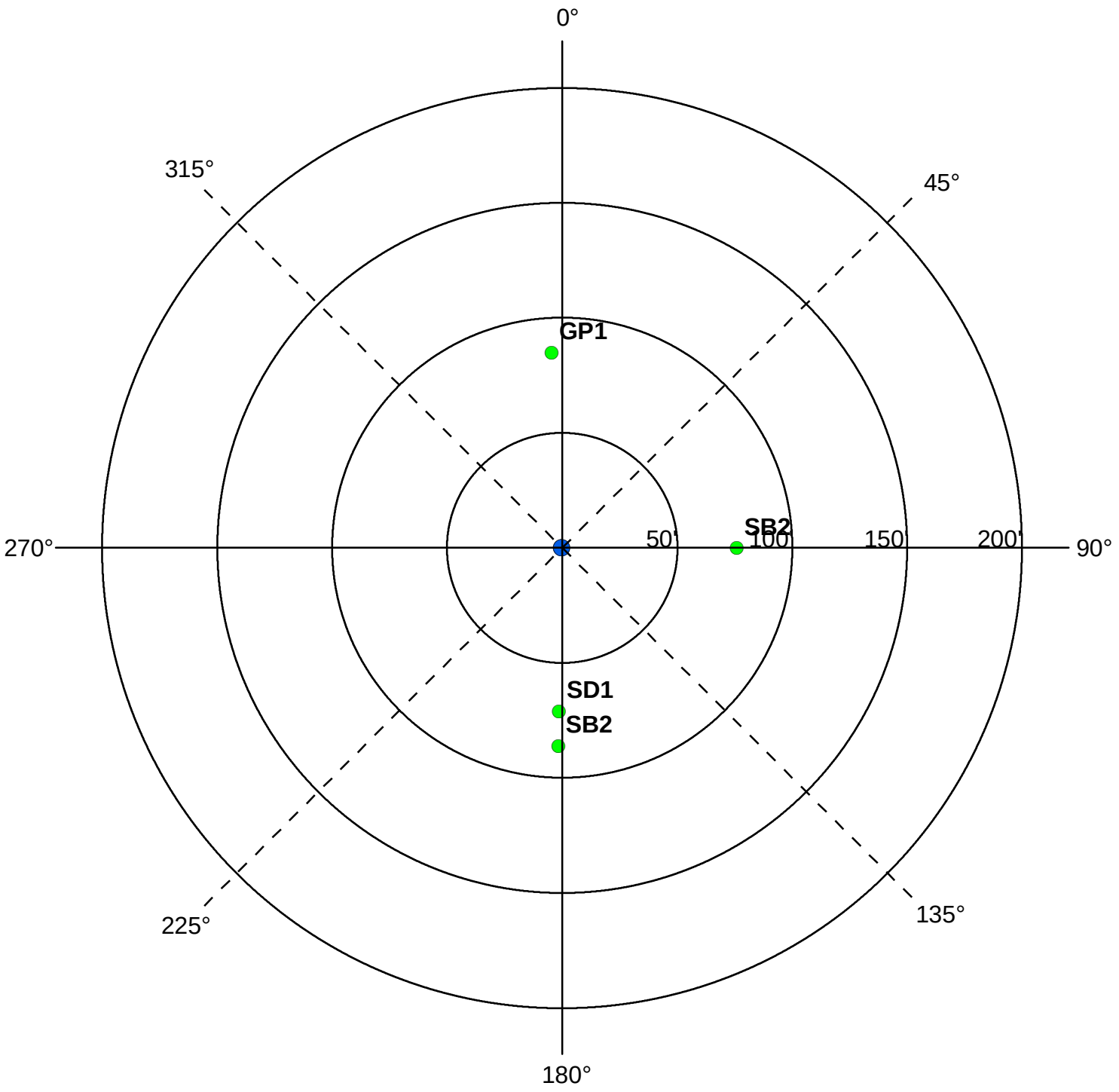
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1820016 S02	UNIQUE WELL NO.	208463

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.



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

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

INSPECTOR	Freitag, John	DATE	7 - 29 - 2013

PWS ID / FACILITY ID	1820016 S02	UNIQUE WELL NO.	208463

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

COMMENTS

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	1820016	**COMMUNITY**
NAME	Oakdale	
ADDRESS	Oakdale Water Superintendent, 1900 Hadley Avenue North, Oakdale, MN 551285407	

FACILITY (WELL) INFORMATION

NAME	Well #3
FACILITY ID	S03
UNIQUE WELL NO.	208454
COUNTY	Washington

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1820016 S03	**UNIQUE WELL NO.**	208454

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		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		

PWS ID / FACILITY ID	1820016 S03	UNIQUE WELL NO.	208454

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				
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		Y	105	N
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	108	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.		N		
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		
*PP1	Petroleum buried piping	50	50		N		

PWS ID / FACILITY ID	1820016 S03	UNIQUE WELL NO.	208454

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				
*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).							
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.

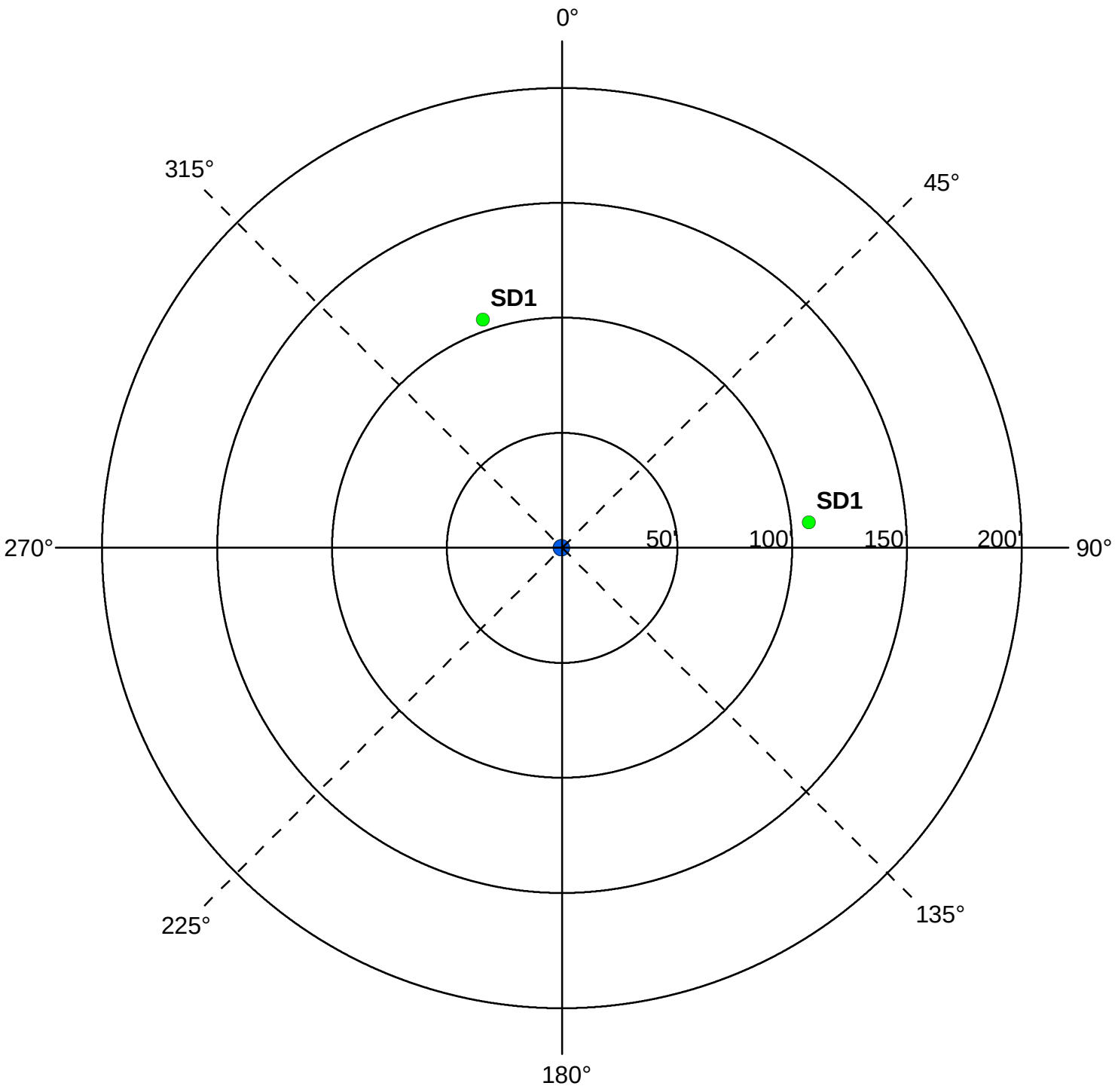
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1820016 S03	UNIQUE WELL NO.	208454

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.



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

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

INSPECTOR	Freitag, John	DATE	7 - 29 - 2013

PWS ID / FACILITY ID	1820016 S03	UNIQUE WELL NO.	208454

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

COMMENTS

9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 12/22/1998) 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	1820016 **COMMUNITY**
NAME	Oakdale
ADDRESS	Oakdale Water Superintendent, 1900 Hadley Avenue North, Oakdale, MN 551285407

FACILITY (WELL) INFORMATION

NAME	Well #5
FACILITY ID	S04
UNIQUE WELL NO.	127287
COUNTY	Washington

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1820016 S04	**UNIQUE WELL NO.**	127287

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		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		

PWS ID / FACILITY ID	1820016 S04	UNIQUE WELL NO.	127287

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				
PR1	Privy, nonportable	50	50	100	N		
PR2	Portable (privy) or toilet	50	20		Y	50	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		Y	158	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		Y	177	N
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	82	N
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	160	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.		N		
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		Y	82	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	1820016 S04	UNIQUE WELL NO.	127287

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).							
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.

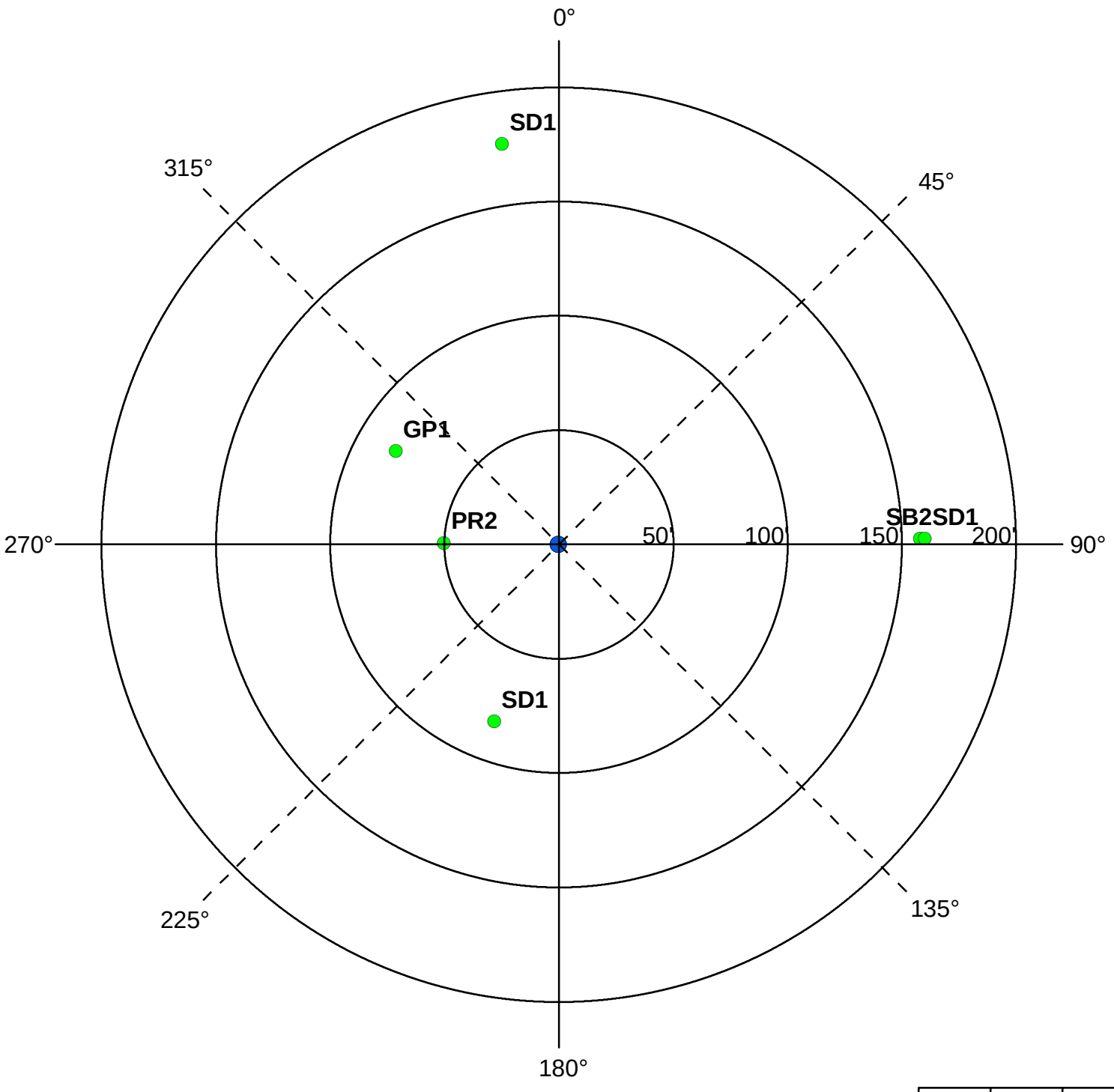
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1820016 S04	UNIQUE WELL NO.	127287

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.



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

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

INSPECTOR	Freitag, John	DATE	7 - 29 - 2013

PWS ID / FACILITY ID	1820016 S04	UNIQUE WELL NO.	127287

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

COMMENTS

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	1820016 **COMMUNITY**
NAME	Oakdale
ADDRESS	Oakdale Water Superintendent, 1900 Hadley Avenue North, Oakdale, MN 551285407

FACILITY (WELL) INFORMATION

NAME	Well #6
FACILITY ID	S05
UNIQUE WELL NO.	151575
COUNTY	Washington

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1820016 S05	**UNIQUE WELL NO.**	151575

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		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		

PWS ID / FACILITY ID	1820016 S05	UNIQUE WELL NO.	151575

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				
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		Y	170	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.		N		
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		
*PP1	Petroleum buried piping	50	50		N		
*PP2	Petroleum or crude oil pipeline to a refinery or distribution center	100	100		N		

PWS ID / FACILITY ID	1820016 S05	UNIQUE WELL NO.	151575

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				
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).							
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.

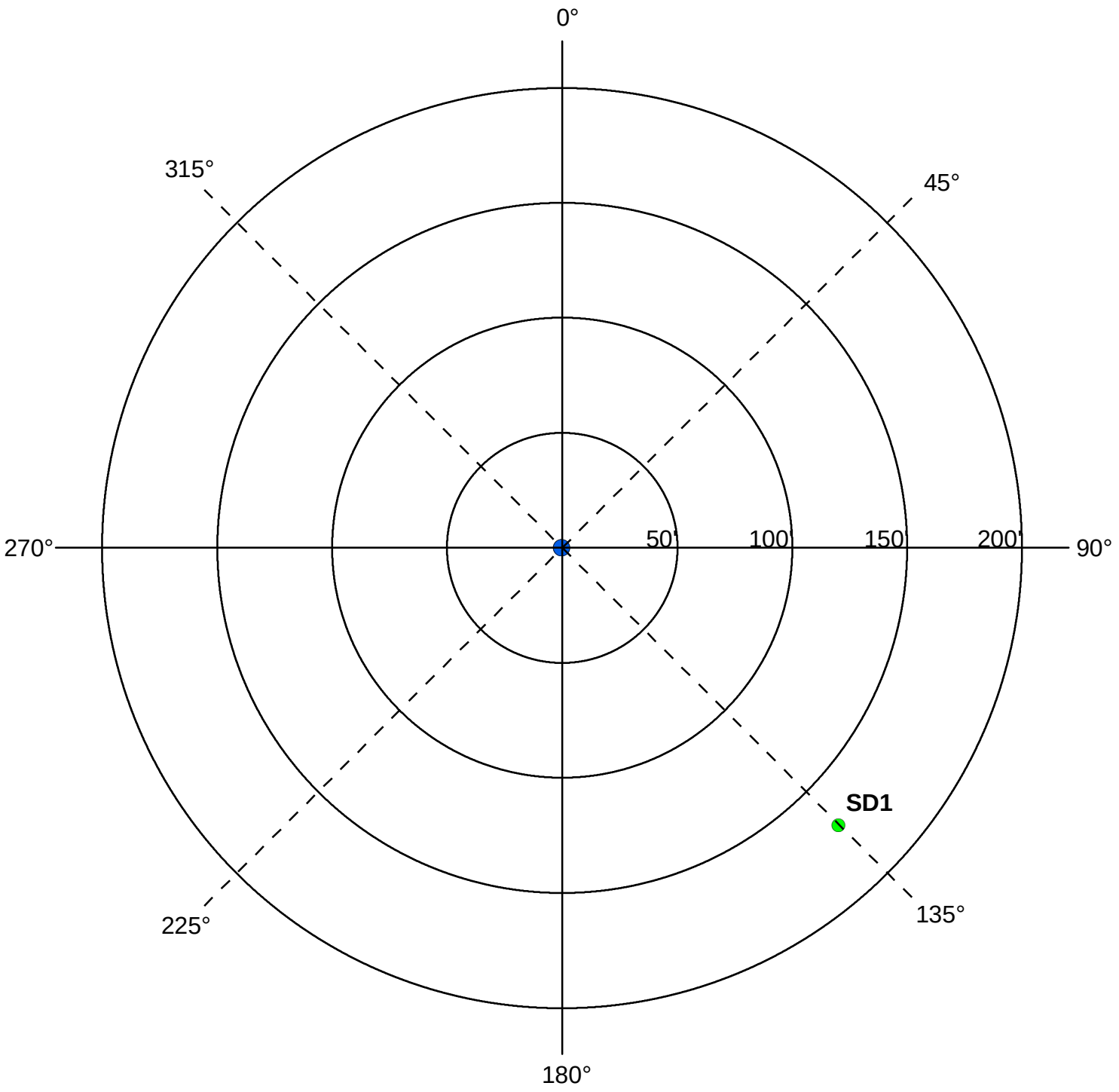
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1820016 S05	UNIQUE WELL NO.	151575

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.



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

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

INSPECTOR	Freitag, John	DATE	7 - 29 - 2013

PWS ID / FACILITY ID	1820016 S05	UNIQUE WELL NO.	151575

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

COMMENTS

9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 12/22/1998) 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	1820016 **COMMUNITY**
NAME	Oakdale
ADDRESS	Oakdale Water Superintendent, 1900 Hadley Avenue North, Oakdale, MN 551285407

FACILITY (WELL) INFORMATION

NAME	Well #7
FACILITY ID	S06
UNIQUE WELL NO.	463534
COUNTY	Washington

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1820016 S06	**UNIQUE WELL NO.**	463534

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		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		

PWS ID / FACILITY ID	1820016 S06	UNIQUE WELL NO.	463534

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				
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		Y	113	N
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	108	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		Y	93	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.		N		
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	1820016 S06	UNIQUE WELL NO.	463534

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).							
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.

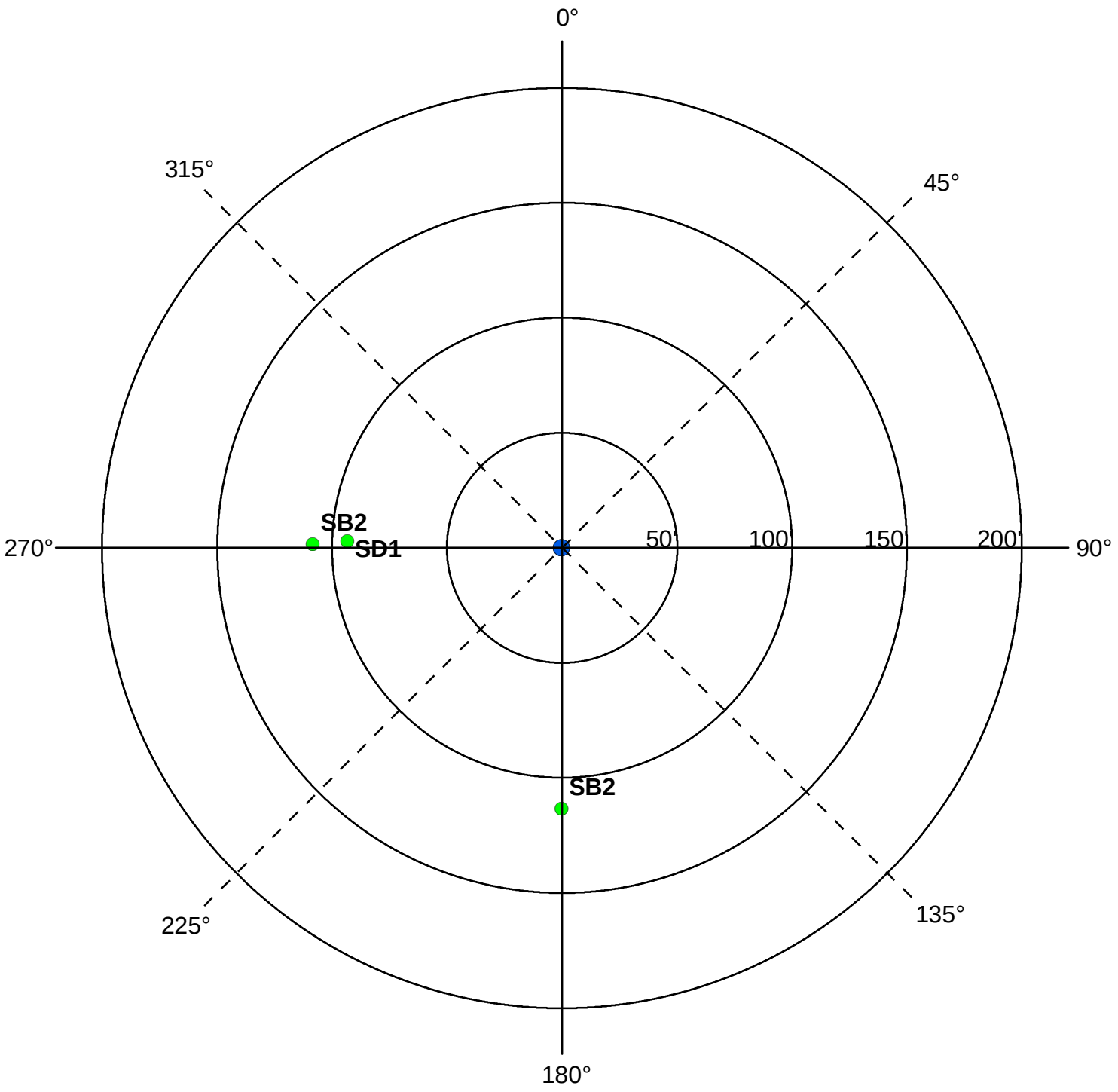
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1820016 S06	UNIQUE WELL NO.	463534

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.



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

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

INSPECTOR	Freitag, John	DATE	7 - 29 - 2013

PWS ID / FACILITY ID	1820016 S06	UNIQUE WELL NO.	463534

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

COMMENTS

9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 12/22/1998) 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	1820016	**COMMUNITY**
NAME	Oakdale	
ADDRESS	Oakdale Water Superintendent, 1900 Hadley Avenue North, Oakdale, MN 551285407	

FACILITY (WELL) INFORMATION

NAME	Well #8
FACILITY ID	S07
UNIQUE WELL NO.	572608
COUNTY	Washington

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1820016 S07	**UNIQUE WELL NO.**	572608

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		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		

PWS ID / FACILITY ID	1820016 S07	UNIQUE WELL NO.	572608

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				
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		Y	106	N
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	103	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		Y	58	N
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	50	N
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	200	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.		N		
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		

PWS ID / FACILITY ID	1820016 S07	UNIQUE WELL NO.	572608

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				
OH1	Ordinary high water level of a stream, river, pond, lake, reservoir, or drainage ditch (holds water six months or more)	50	35		N		
*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).							
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.

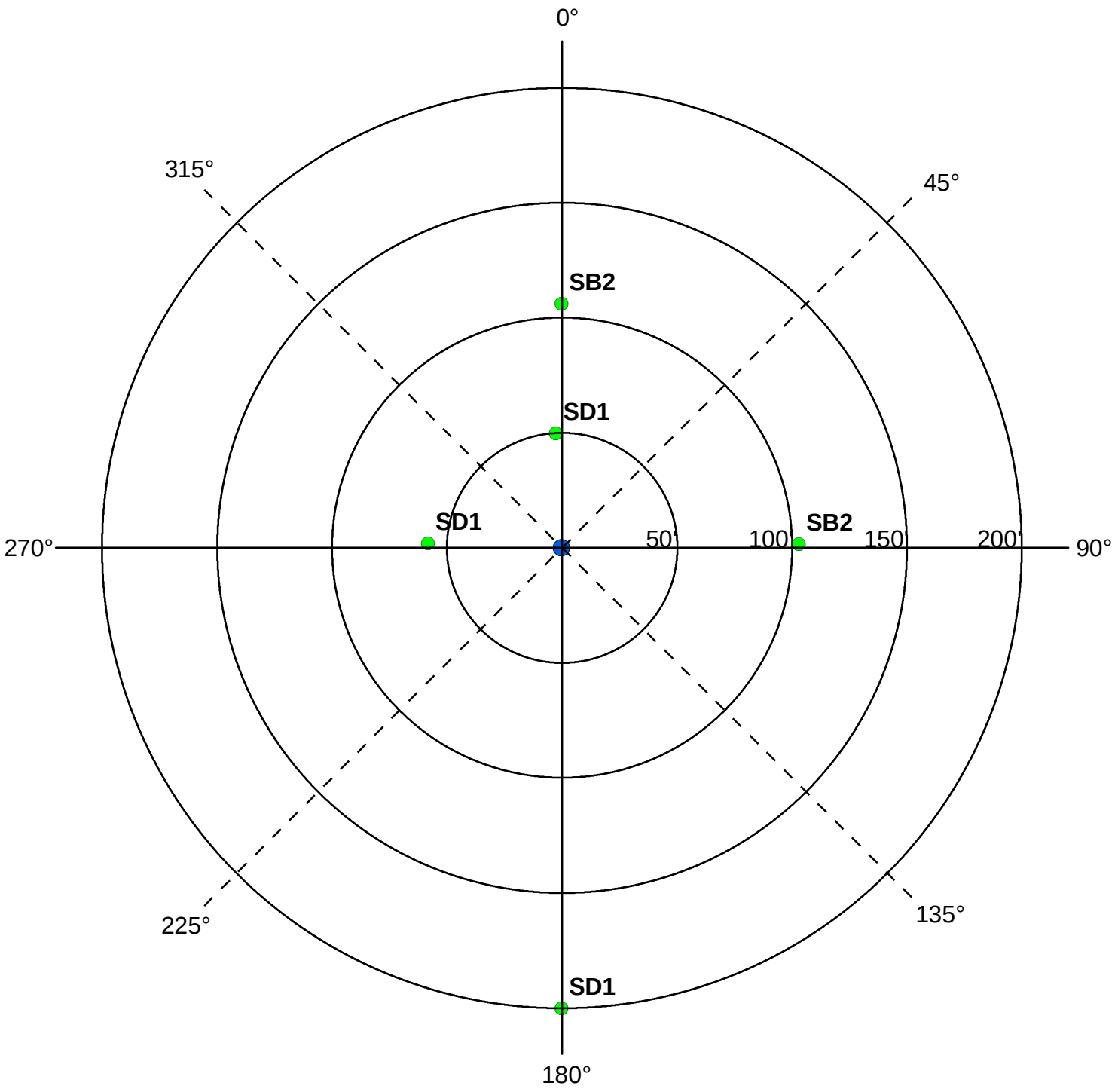
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1820016 S07	UNIQUE WELL NO.	572608

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.



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

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

INSPECTOR	Freitag, John	DATE	7 - 29 - 2013

PWS ID / FACILITY ID	1820016 S07	UNIQUE WELL NO.	572608

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

COMMENTS

9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 12/22/1998) 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	1820016 **COMMUNITY**
NAME	Oakdale
ADDRESS	Oakdale Water Superintendent, 1900 Hadley Avenue North, Oakdale, MN 551285407

FACILITY (WELL) INFORMATION

NAME	Well #9
FACILITY ID	S08
UNIQUE WELL NO.	611059
COUNTY	Washington

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1820016 S08	**UNIQUE WELL NO.**	611059

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		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		

PWS ID / FACILITY ID	1820016 S08	UNIQUE WELL NO.	611059

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				
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		Y	66	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		Y	173	N
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	117	N
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	70	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.		N		
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	1820016 S08	UNIQUE WELL NO.	611059

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).							
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.

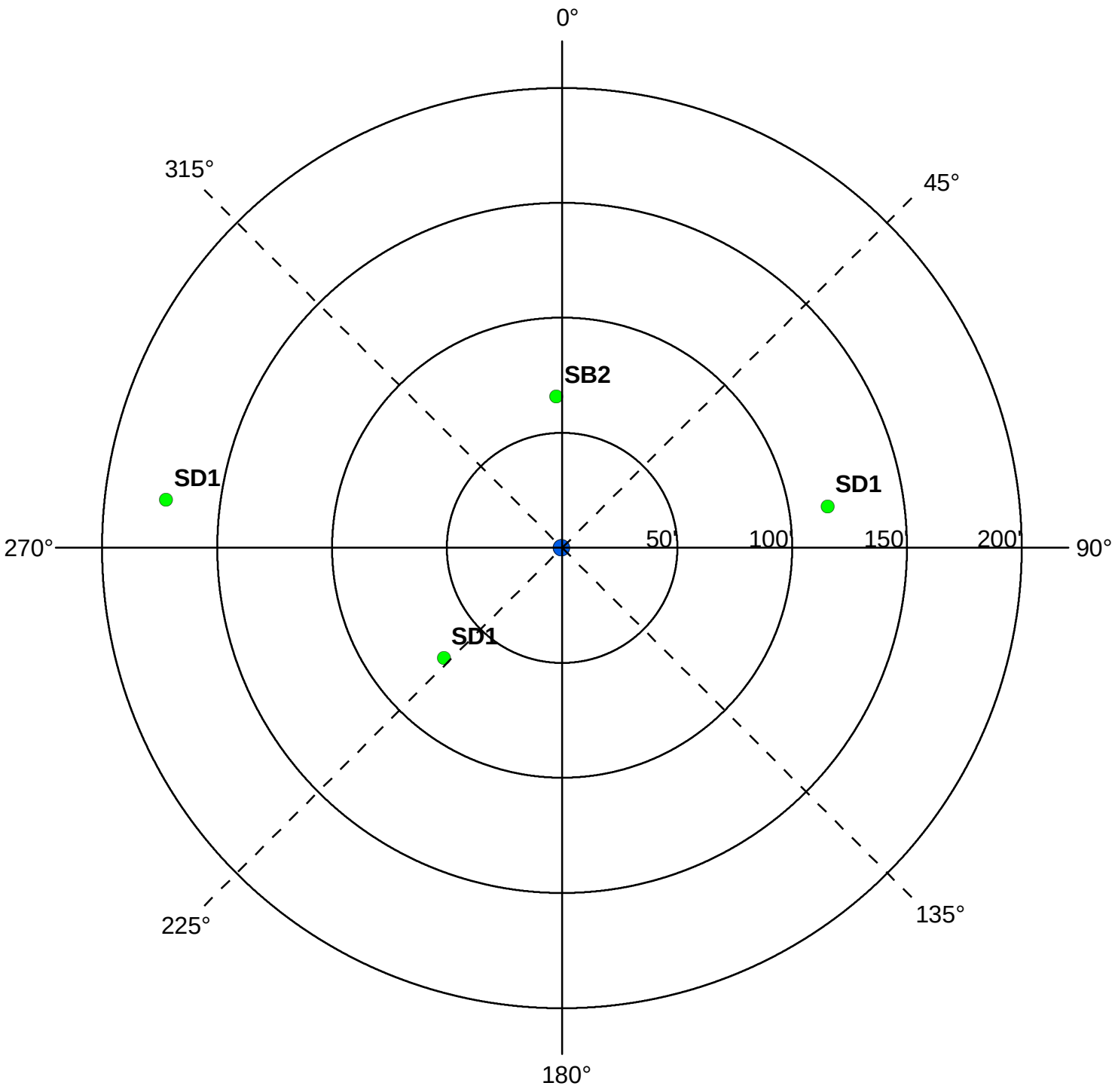
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1820016 S08	UNIQUE WELL NO.	611059

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.



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

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

INSPECTOR	Freitag, John	DATE	7 - 29 - 2013

PWS ID / FACILITY ID	1820016 S08	UNIQUE WELL NO.	611059

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

COMMENTS

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	1820016 **COMMUNITY**
NAME	Oakdale
ADDRESS	Oakdale Water Superintendent, 1900 Hadley Avenue North, Oakdale, MN 551285407

FACILITY (WELL) INFORMATION

NAME	Well #10
FACILITY ID	S09
UNIQUE WELL NO.	773389
COUNTY	Washington

IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?

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

PWS ID / FACILITY ID	1820016 S09	**UNIQUE WELL NO.**	773389

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		
MVW	Motor vehicle waste disposal (Class V well - illegal)[2]	illegal	illegal		N		

PWS ID / FACILITY ID	1820016 S09	UNIQUE WELL NO.	773389

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				
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		Y	61	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		Y	77	N
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		Y	66	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		Y	139	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.		N		
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		
*PP1	Petroleum buried piping	50	50		N		

PWS ID / FACILITY ID	1820016 S09	UNIQUE WELL NO.	773389

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				
*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).							
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.

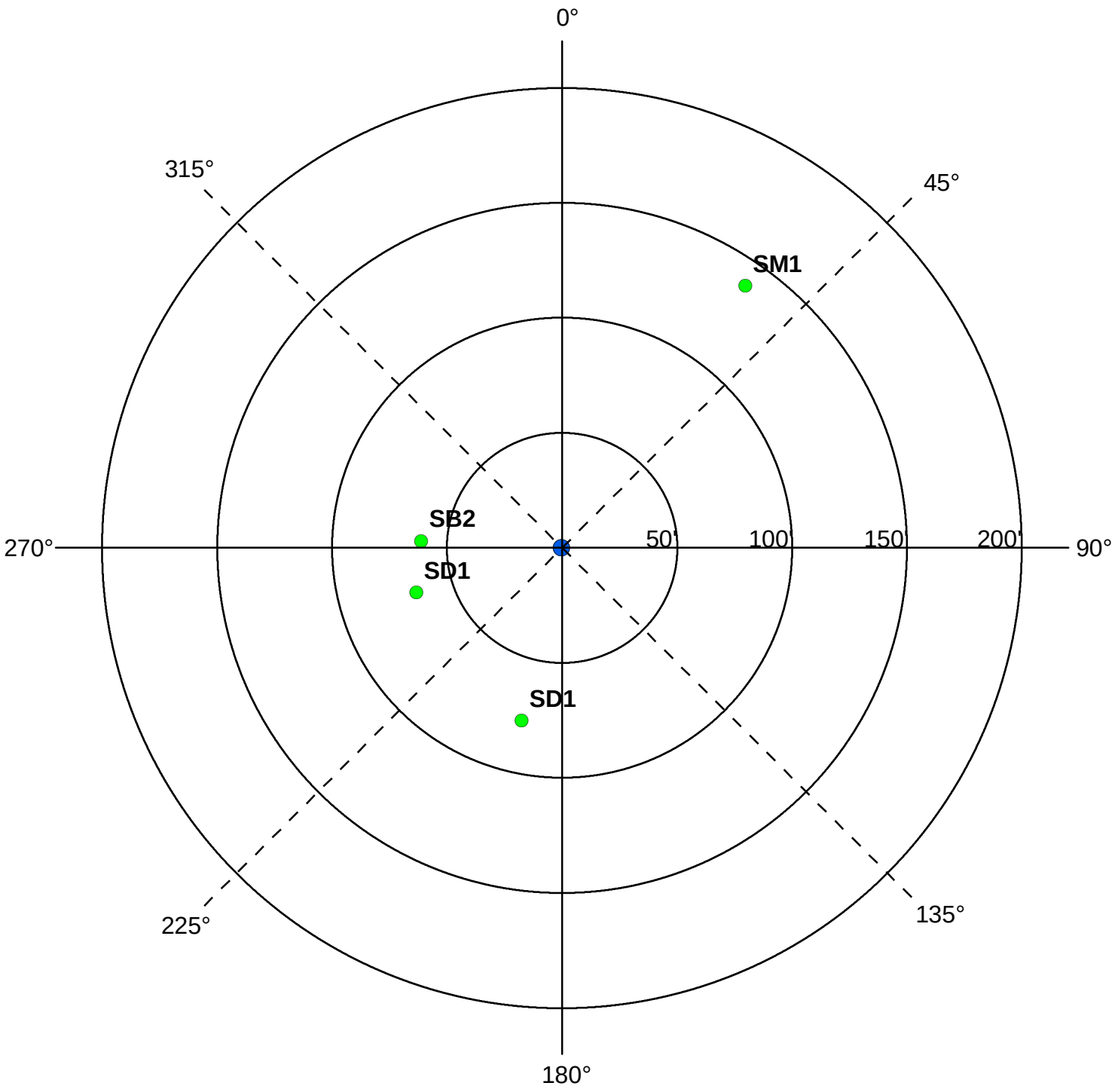
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1820016 S09	UNIQUE WELL NO.	773389

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.



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

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

INSPECTOR	Freitag, John	DATE	7 - 29 - 2012

PWS ID / FACILITY ID	1820016 S09	UNIQUE WELL NO.	773389

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

COMMENTS

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

APPENDIX F

DOCUMENTATION OF PUBLIC HEARING

Affidavit of Publication

State of Minnesota }
County of Washington } SS

JANINE GAFFNEY, being duly sworn, on oath, says that he/she is the publisher or authorized agent and employee of the publisher of the newspaper known as OAKDALE/LAKE ELMO REVIEW, and has full knowledge of the facts which are stated below:

(A) The newspaper has complied with all of the requirements constituting qualification as a qualified newspaper, as provided by Minnesota Statute 331A.02, 331A.07, and other applicable laws, as amended.

(B) The printed NOTICE OF PUBLIC HEARING

which is attached was cut from the columns of said newspaper, and was printed and published once each week, for 1 successive weeks; it was first published on WEDNESDAY, the 8TH day of MARCH, 2017, and was thereafter printed and published on every _____ to and including _____, the _____ day of _____, 20____; and printed below is a copy of the lower case alphabet from A to Z, both inclusive, which is hereby acknowledged as being the size and kind of type used in the composition and publication of the notice:

*ABCDEFGHIJKLMNOPQRSTUVWXYZ
*ABCDEFGHIJKLMNOPQRSTUVWXYZ
*abcdefghijklmnopqrstuvwxyz

BY: _____
TITLE LEGAL COORDINATOR

Subscribed and sworn to before me on
this 8TH day of MARCH, 2017.

Tonya R Whitehead
Notary Public

*Alphabet should be in the same size and kind of type as the notice.

TONYA R. WHITEHEAD
Notary Public-Minnesota
My Commission Expires Jan 31, 2020

RATE INFORMATION

(1) Lowest classified rate paid by commercial users for comparable space.....$25.00 per col. inch

(2) Maximum rate allowed by law for the above matter.....$25.00 per col. inch

(3) Rate actually charged for the above matter.....$ per col. inch

CITY OF OAKDALE
NOTICE OF
PUBLIC HEARING
PART 2 WELLHEAD
PROTECTION PLAN

NOTICE IS HEREBY GIVEN that the City Council of the City of Oakdale will meet at 7 p.m. on March 28, 2017 at 1584 Hadley Avenue to discuss Oakdale's Part 2 Wellhead Protection Plan. Written and oral comments from the public will be accepted at that time. A copy of the plan is available for public inspection at City Hall, 1584 Hadley Avenue.

The Wellhead Protection Plan is designed to continue the city's efforts to prevent human-caused contamination from entering the public water supply wells. The plan identifies the area of the groundwater aquifer that supplies water to the city's wells over a 10-year period. Based on the level of vulnerability of the aquifer within this area, potential sources of contamination were identified and a management plan was created for this area.

Dated: March 1 2017

BY ORDER OF THE CITY COUNCIL

CITY OF OAKDALE, MINNESOTA

(Review: Mar. 8, 2017)

REGULAR MEETING
OAKDALE CITY COUNCIL
March 28, 2017
No. 2017-06

CALL TO ORDER

A regular meeting of the City Council of the City of Oakdale was held on Tuesday, March 28, 2017, at the Oakdale Municipal Building, 1584 Hadley Avenue North, Oakdale, Minnesota. The meeting was called to order by Mayor Paul Reinke at 7 pm.

CALL OF ROLL

On a call of roll, the following were present:

Mayor Paul Reinke

Councilmembers:	Kristen Cici
	Lori Pulkrabek
	Bill Rasmussen
	Kevin Zabel
Absent:	None
Also Present:	Brian Bachmeier, Public Works Director / City Engineer
	Susan Barry, City Clerk
	Bart Fischer, City Administrator
	Linnea Graffunder-Bartels, Senior Community Development Specialist
	Emily Shively, City Planner
	Bob Streetar, Community Development Director
	Bill Sullivan, Chief of Police
	Jim Thomson, City Attorney
	Suzanne Warren, Finance Director

PLEDGE OF ALLEGIANCE

APPROVAL OF MINUTES: **Workshop, March 14, 2017**
Regular Meeting No. 2017-05, March 14, 2017

A MOTION WAS MADE BY COUNCILMEMBER RASMUSSEN, SECONDED BY COUNCILMEMBER ZABEL, TO APPROVE THE WORKSHOP MINUTES OF MARCH 14, 2017, WITH THE FOLLOWING CORRECTION:

Page One, Attendance to read:

Present:	**Mayor Paul Reinke**	
	Councilmembers	**Kristen Cici**
		Bill Pulkrabek
		Kevin Zabel
Absent:	**Councilmember Lori Pulkrabek**	

4 AYES. 1 ABSTENTION – PULKRABEK.

A MOTION WAS MADE BY COUNCILMEMBER RASMUSSEN, SECONDED BY COUNCILMEMBER ZABEL, TO APPROVE THE MINUTES OF REGULAR MEETING NO. 2017-05, DATED MARCH 14, AS PRESENTED.

4 AYES. 1 ABSTENTION – PULKRABEK.

PUBLIC HEARING: WELLHEAD PROTECTION PLAN, PART 2

Public Works Director / City Engineer Bachmeier explained that the city is required to conduct a public hearing to review Part 2 of the city's "Wellhead Protection Plan". He introduced Mark Janovec of Stantec Consulting, who worked with the city on completing Part 2 of the plan.

Mark Janovec, Stantec Consulting, provided an overview of the city's "Wellhead Protection Plan, Part 2", which concluded that the aquifer is "moderately vulnerable". He explained that the study included identifying possible sources of contamination, which include wells and storage tanks. Mr. Janovec commented on the importance of sealing unused wells and that grant funds were available to property owners to seal wells.

In response to a question from Councilmember Zabel, Mr. Janovec explained that the grants funds are provided through the city from the Minnesota Department of Health.

Mayor Reinke opened the hearing up to the audience; no comments were heard.

Mayor Reinke closed the hearing.

A MOTION WAS MADE BY COUNCILMEMBER ZABEL, SECONDED BY COUNCILMEMBER PULKRABEK, TO DIRECT STAFF TO SUBMIT THE WELLHEAD PROTECTION PLAN, PART 2, TO THE MINNESOTA DEPARTMENT OF HEALTH FOR FINAL REVIEW AND APPROVAL.

5 AYES.

APPENDIX G

CITY OF OAKDALE
PART 1 WELLHEAD PROTECTION PLAN
(AMENDMENT)

CITY OF OAKDALE
WELLHEAD PROTECTION PLAN
PART I (AMENDMENT)

SEPTEMBER 14, 2015

Stantec Project No. 193801820

CITY OF OAKDALE

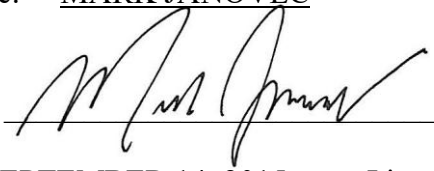
WELLHEAD PROTECTION PLAN – PART 1 (AMENDMENT)

SEPTEMBER 14, 2015

WELLHEAD PROTECTION AREA AND DRINKING WATER SUPPLY MANAGEMENT AREA DELINEATION AND VULNERABILITY ASSESSMENTS

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Geologist under the laws of the State of Minnesota.

Print Name: MARK JANOVEC

Signature: 

Date: SEPTEMBER 14, 2015 License # 45625

Table of Contents

TABLES

FIGURES

APPENDICES

Appendix A City of Oakdale Well Logs

Appendix B Model Calibration Results

Appendix C Well Vulnerability Assessment Worksheets

Appendix D Assessment of Data Elements

Appendix E Electronic Data Files

EXECUTIVE SUMMARY

This report documents the amended delineation of the wellhead protection area (WHPA) and drinking water supply management area (DWSMA) and the vulnerability assessments for the wells and DWSMA for the City of Oakdale drinking water supply wells (Table 1). The amended plan covers the wells listed in Table 1. Well logs are presented in Appendix A. The delineation was performed in accordance with rules (Minnesota Rules 4720.5100 to 4720.5590) for preparing and implementing wellhead protection measures for public water supply wells. The rules are administered by the Minnesota Department of Health (MDH), and the results described in this report were prepared by Stantec.

The City of Oakdale currently obtains its drinking water supply from eight active wells (and one emergency well) completed in the Jordan sandstone aquifer. The WHPA and DWSMA delineations and well and DWSMA vulnerability assessments for the City's wells was initially prepared in September 2002 by Hydrogeological and Modeling Services, Inc. in the report *City of Oakdale Wellhead Protection Plan: Part 1* (included within Appendix D). Since the time that plan was completed, the MDH has updated their guidance for delineating wellhead protection areas in setting where aquifers (such as the Jordan sandstone) are overlaid by fractured bedrock formations (such as the Prairie du Chien dolomite) that can rapidly transmit water (and contaminants). Also, the 10-year delineation update deadline has passed, necessitating an update to the City's wellhead protection delineations. As such, a full update is being undertaken to bring the Part 1 plan up to date.

A computer groundwater modeling platform was utilized for this project. The porous-flow portion of the wellhead protection areas (WHPAs) for Oakdale's Jordan aquifer wells were delineated using a modified version of the Metropolitan Councils Metro Model 2, originally built in 2009. This model is a steady state MODFLOW model built using Groundwater Vistas. The model was updated to reflect current pumping and geological conditions in and near the area around the Oakdale well field. The model was used to delineate one-year and ten-year capture zones for Oakdale's wells (Figure 1).

A fracture flow analysis was then undertaken using current MDH methodology to predict the area of the Prairie du Chien aquifer (which overlies the Jordan aquifer) that is capable of rapidly transmitting water to the 10-year Jordan capture zone. This fracture flow delineation was created by utilizing MDH guidance developed for fracture flow settings. The calculated area is shown in Figure 2.

The drinking water supply management area (DWSMA) was determined for the composite groundwater delineations by using property parcels and roadways as boundaries. Figure 3 shows the boundaries of both the WHPA and the DWSMA.

The amount of geologic protection documented in well logs from the water supply wells and regional information, along with water quality information was used to determine well vulnerability. All of Oakdale's wells are considered vulnerable to contamination. High tritium and moderate nitrates concentrations were main reasons for the vulnerable classifications. Geologic sensitivity also contributed to the vulnerability of the wells in this area. Oakdale's wells appear to meet the construction standards of the State Well Code, however, and the wells themselves are not considered a likely avenue for contamination to reach the aquifer from which they pump.

The groundwater DWSMA has a moderate vulnerability to contamination from contamination at or near the land surface. This is based on the presence of continuous layers of confining materials (e.g. clay or

shale) that could impede vertical infiltration of contaminants. While geologic sensitivity across the DWSMA ranges from low to moderate, the presence of tritium and nitrates in the City's wells suggests an overall moderate vulnerability designation is appropriate. Vulnerability is displayed in Figure 4, while geologic cross-sections are shown in Figures 5, 6, and 7. Aquifer vulnerability will be used to define the scope of activities required to complete the amendment to Part 2 of the Wellhead Protection Plan.

CHAPTER ONE
DATA ELEMENTS and ASSESSMENT (4720.5200)

PART 1. REQUIRED DATA ELEMENTS

This section contains required data elements that were outlined in the Scoping Decision Notice provided to Oakdale by the MDH. Appendix D contains a table assessing the data elements required for this plan. Below is a summary of each data element.

A. Physical Environment Data Elements

Geology, soils, and water resources data elements are provided in *City of Oakdale Wellhead Protection Plan: Part 1* (Hydrogeological and Modeling Services Inc, September 2002). See Appendix D for the 2002 report files. The impact of precipitation on aquifer recharge is addressed in the Metropolitan Council's Metro Model (October 2009). At this time, there is no data to suggest that precipitation rates in Oakdale vary significantly from the surrounding areas that would necessitate updating the model.

Updated geologic cross-sections for the Oakdale Well Field are provided as Figures 5-7 in this amended plan.

B. Land Use Data Elements

1. **Land use** – Land use was generally not considered for the Part 1 wellhead protection activities. Land use will be covered in greater detail in the updated Part 2 plan, where the role of land use on water quality will be closely reviewed.

2. **Public utility services** – The only public utilities that play a role in the Part 1 Wellhead Protection Plan are the municipal water supply wells in Oakdale and other nearby public water supply wells for surrounding communities that utilize the Prairie du Chien and Jordan aquifers (St. Paul, Lake Elmo, Woodbury, etc.). Table 2 shows the modeled rates of the wells operated by Oakdale. All high capacity wells in the DNR SWUDs database were already included in the MODFLOW model. However, nearby high capacity wells which exceed 10 million gallons per year have been modified (or added) to the model to reflect current conditions. Table 3 shows the modeled rates of municipal wells from surrounding communities that were either added or modified from the existing Metropolitan Council model. Well usage is also addressed in Part 2 of this chapter.

C. Water Quantity Data Elements

1. **Surface water quantity** – The Minnesota River and Mississippi River are the major discharge features located within the domain of the models developed for this project. Numerous smaller discharge features have been added to the model domain and are explained in greater detail in the Metropolitan Council's technical report for the Metropolitan Model (October 2009).

2. **Groundwater quantity** - Review of groundwater appropriations permits in the State Water Use Data System (SWUDS) database was performed to identify high capacity wells in the area that might affect delineation of the wellhead protection area. Most high capacity wells as of 2009 were included in the Metropolitan Council's model. High capacity wells within Oakdale and nearby communities were updated in the model for the purposes of this delineation effort and are listed in Tables 2 and 3. The City of Oakdale wells were modeled at the rate outlined in the wellhead protection rules, based on historical or projected within with 5 years of the current date.

D. Water Quality Data Elements

1. **Surface water quality** – Major surface water features in the area, such as the Minnesota River and Mississippi River, which are in direct hydraulic connection with the Prairie du Chien and Jordan aquifers, serve as flow boundaries within select layers of the Metropolitan Model. The Prairie du Chien and Jordan aquifers are also in connection with more localized streams and lakes, such as Lake Elmo. In general, nitrates contamination within these aquifers is a source for concern in portions of Washington County. However, at present, nitrates levels in the Oakdale wells do not exceed the threshold of 10mg/L and do not appear to be significantly rising, as land uses in the area have moved from agricultural to more residential in recent decades. Surface water quality will be addressed in greater detail in the updated Part 2 plan.

2. **Groundwater quality** – Results of routine monitoring of the Oakdale wells are contained within the files of the Minnesota Department of Health. Historical monitoring has shown that the water quality within the Jordan aquifer in Oakdale is generally of excellent quality. Nitrates contamination, which is a source of concern in parts of Washington County, does not appear to currently pose a problem in Oakdale. Nitrates levels in Oakdale' wells remain well below the health risk limit threshold of 10mg/L.

   Sampling of tritium has taken place at Oakdale Wells No. 1. Tritium is an isotope of hydrogen that was released into the atmosphere during the above-ground testing of nuclear weapons in the early 1950s. While harmless, the presence of tritium in aquifers indicates that some portion of the water was in contact with the atmosphere within the past 60 years. A tritium level of 1 tritium unit (TU) or greater is an indication that these aquifers are somewhat vulnerable to contamination. The tritium levels of Wells 2, 3, 5, 7, and 10 were measured to between 2.0 and 8.6 tritium units. (The other City wells have not been tested to date.) The presence of tritium in every City of Oakdale well tested to date indicates that the Jordan aquifer in Oakdale contains relatively recent groundwater, and is therefore vulnerable to contamination.

   Additionally, the presence of Perfluorochemicals (PFCs) has been detected in multiple Washington County wells, including Oakdale's wells, since testing was initiated in 2005. The concentrations of PFCs at Oakdale Wells 5 and 9 were high enough that a water filtration plant was built to reduce PFC levels in the City's drinking water supply. While PFCs will be focused on more heavily in the amended Part 2 plan, the presence of PFCs indicates that man-made contaminants have penetrated to the Jordan aquifer over the past 50 years.

PART 2. ASSESSMENT OF DATA ELEMENTS USED TO DELINEATE THE WELLHEAD PROTECTION AREA

A. Use of the Wells – The wells shown in Table 1 serve as the primary drinking water source for residents of the City of Oakdale. The only exception is Well 6, which is currently classified for emergency use only. Pumping from the primary water supply wells is rotated based on water demand and seasonal usage.

Table 2 shows a comparison of the usage of the City of Oakdale wells for the past five years versus a projected pumping rate 5 years into the future. The greatest amount of pumping from any of these years is used to represent the pumping rate for that well in the groundwater model. This is done for the purpose of developing a delineation that is conservative and takes into account the potential volume each well may be used in the near future.

Other high capacity wells being included within the model, but not being delineated for the plan, are modeled using an average pumping rate taken from a 5 year period. This is explained in greater detail in the Metropolitan Council's 2009 technical report for the Metropolitan Model. High capacity wells shown in Table 3 were modeled based on an average rate from the years 2007-2011. These pumping volumes modify the volumes originally modeled by the Metropolitan Council. In some cases, the wells in Table 3 are new additions to the model which weren't yet active when the model was originally constructed.

B. Wellhead Protection Area Delineation Criteria

1. **Time of travel** – The minimum time-of-travel for porous-flow aquifer delineations is 10-years, which is what was used for the Jordan aquifer. A 1-year-year time-of-travel zone was also delineated using standard techniques and represents the Emergency Management Area. An additional delineation of the Jordan aquifer wells beyond the 10-year porous-flow capture zone was also conducted and is described in greater detail in Chapter Two.

2. **Hydrologic flow boundaries** – The Minnesota River and Mississippi River represents the major flow boundaries for the Jordan aquifer in the Dakota County area. Hydrologic flow boundaries included in the groundwater model are documented in greater detail in the technical report for the Metropolitan Model (Metropolitan Council, 2009).

3. **Daily volume** – Projected annual pumping volumes for the Oakdale wells are shown in Table 2. The maximum projected annual pumping volumes were converted to cubic meters per day in order to be applied to the groundwater model.

4. **Groundwater flow field** – The groundwater flow field was calculated by the groundwater flow model. Original model calibration and ambient flow-field simulation results are described in the technical report for the Metropolitan Model (Metropolitan Council, 2009). Model calibration remains relatively unchanged, since the only significant updates to the model are updates to the number of wells and their pumping rates, and minor changes to hydraulic conductivity near the Oakdale well field. These changes were not enough to significantly impact calibration results.

5. **Aquifer transmissivity** – Aquifer transmissivity was calculated using three different aquifer pumping tests conducted at Wells 5, 9, and 10 between 1998 and 2011. The three tests are summarized below:

   - Test 1: The aquifer pumping test was conducted by the MDH on Oakdale Well No. 5 on October 15 and 16, 1998. Data from this test is provided in the "Test Description" section (above). City Wells No. 2 was used as observation wells during the pumping

and recovery test. The results of the aquifer pumping test show that the calculated transmissivity at Well No. 5 was approximately 2,600 ft2/day. The calculated transmissivity at Well No. 2 ranged between 5,975 ft2/day and 7,468 ft2/day. The mean transmissivity is calculated to be 6,723 ft2/day. The thickness of the Jordan aquifer at Well 5 is 89 feet, which results in a calculated average hydraulic conductivity of 75.5 ft/day (or 23.0 m/d).

- Test 2: The aquifer pumping test was conducted by the MDH at Well 9 in October 2001, using Well 5 as an observation well. The results of the test showed a calculated transmissivity at Well 5 of 2,845 ft2/day using the Leaky Hantush method, which results in a hydraulic conductivity of 31.6 ft/day using a thickness of 90 feet for the Jordan.

- Test 3: The aquifer pumping test was conducted by Renner and Sons at Well 10 in April 2011 during well construction. Calculated transmissivity using the Leaky Hantush method was 1,885 ft2/day. Calculated hydraulic conductivity, using the thickness of the Jordan of 86 feet, is 21.9 ft/day.

Using the above three tests, the model hydraulic conductivity for each well (and nearby surrounding wells) is proposed to be the following:

Well 2 (and Wells 1, 7): 75.5 ft/day (23.0 m/d)
Well 5 (and Wells 8, 9): 31.6 ft/day (9.6 m/d)
Well 10 (and Well 3): 21.9 ft/day (6.7 m/d)

Modeled hydraulic conductivity for the Jordan aquifer varies throughout the Metropolitan Model. Methodology for selecting different conductivity values is documented within the technical report (Metropolitan Council, 2009).

For the purposes of this modeling effort, the observed values were used for the modeling conductivity around the Oakdale well field, since it is based on data directly gathered from the Oakdale municipal wells and is therefore likely a more reliable measurement of local conditions.

C. Quality and Quantity of Water Supplying the Public Water Supply Well - Water in the City of Oakdale water distribution system is regularly sampled and analyzed for contaminants regulated under the federal Safe Drinking Water Act. Routine monitoring by the Public Water Supply Program at MDH does not indicate contamination that may pose a public health risk. No contaminants of significant concern have been detected in the City's wells, however the elevated tritium concentrations do indicate that the Jordan aquifer is somewhat vulnerable to contamination.

The Jordan aquifer appears to have sufficient transmissivity and recharge to remain a long-term source of drinking water for the residents of Oakdale. Any future water supply wells will most likely be completed within the Jordan aquifer. Monitoring of water levels within the aquifer in the region will help establish the long term sustainability of the aquifer as Washington County (and the larger metropolitan area) continues to develop. Water level data collected in the Oakdale wells will help determine the sustainability of the aquifer.

D. The Land Uses in the Drinking Water Supply Management Area – Land uses in the DWSMA for the Oakdale wells is primarily residential and commercial, with some park, industrial, and agricultural land uses as well. Land uses will be discussed in greater detail in the amended Part 2 Wellhead Protection Plan, which will include the contaminant source inventory for parcels within the DWSMA.

CHAPTER TWO
WELLHEAD PROTECTION AREA AND DRINKING WATER SUPPLY MANAGEMENT AREA DELINEATION (4720.5205)

A. Physical setting and subsurface hydrogeology – The Oakdale municipal wells draw water from the Jordan aquifer. Groundwater flow and the hydrogeologic setting are described in *City of Oakdale Wellhead Protection Plan: Part 1* (Hydrogeological and Modeling Services Inc, September 2002). A discussion of hydrogeologic conditions across the full model domain is presented in the report *Twin Cities Metropolitan Area Regional Groundwater Flow Model Version 2.00* (Metropolitan Council, 2009).

B. Delineation of the Wellhead Protection Area

1. Porous Flow Delineation Method – Jordan Aquifer

The delineation of the Jordan aquifer capture zone was conducted utilizing the modified Metropolitan Model. Original model construction detail, data files, and calibration results are outlined in the Metropolitan Council report (2009). Modifications to the model included:

- Refinement of the model grid was done to reduce model grid size from 500 x 500 meters to 31.25 x 31.25 meters around the Oakdale municipal wells.
- Updating modeled flow rates for Oakdale municipal wells to match wellhead protection rule requirements.
- Updating average modeled flow rates for nearby high capacity wells (both municipal and private) to reflect the period from 2007 to 2011. Updated rates were applied only to wells which regularly pump more than 10 million gallons per year. Wells pumping less than this volume have little impact on modeled capture zones.
- The Jordan Aquifer (layer 4) parameters around the Oakdale area were adjusted to match local values, as shown in Table 4. Horizontal hydraulic conductivity was adjusted to a range from 6.7 m/d to 23.0 m/d, based on the aquifer pumping test at the Oakdale municipal wells. A global porosity of 0.20 was chosen to represent the Jordan aquifer across the model domain. A porosity of 0.054was chosen to represent the overlying Prairie du Chien aquifer.

Calibration of the modified Metropolitan Model was checked using target wells located in Layer 3 (Prairie du Chien aquifer) and Layer 4 (Jordan aquifer). Calibration results from the area around the Oakdale well field are presented in Appendix B. The calibration results indicate a fairly even spread of residual values both above and below the observed values. The model does not appear to be producing head values that are skewed too high or too low.

Additional model runs were conducted where the entire area around the Oakdale well field was modeled with a conductivity of 6.7 m/d (Model Run 8b) and 23.0 m/d (Model Run 8c). This was done to simulate the full range of observed values as part of the uncertainty analysis (describer later in this report).

The delineations were created using particle tracking analysis in MODPATH. A circle of particles was established at a radius of 30 meters from each wellhead and tracking backwards (upgradient) with 120 particle lines per well, released at three different elevations within the Jordan aquifer, at offsets between 0.2 and 0.8. The path line groupings were then outlined to develop capture zones for 1-year and 10-year time-of-travel delineations. Figure 1 shows the

outlined result of the delineation effort. Model files are provided as supplemental data in Appendix D.

2. Fracture Flow Delineation Method – Prairie du Chien Aquifer

Since the Prairie du Chien formation, which overlies the Jordan aquifer, is capable of rapidly transmitting water through its secondary porosity features (fractures and solution cavities) and can transmit water to the underlying Jordan aquifer, an additional delineation effort was required for the Jordan aquifer wells. The Minnesota Department of Health has developed a guidance for delineating the fracture flow component to the delineation of wells in this type of setting, where wells open to a porous-flow aquifer (Jordan) have a fracture flow aquifer (Prairie du Chien) overlying the aquifer being pumped. The methodology is outlined in greater detail in *Guidance for Delineating Wellhead Protection Areas in Fractured and Solution-Weathered Bedrock in Minnesota* (Minnesota Department of Health, December 2011).

While the volume of the calculated porous delineation of the Jordan aquifer can account for the full 10-year volume of water pumped from the Oakdale wells, anecdotal evidence (including tritium data) suggest that recharge from the overlying Prairie du Chien aquifer results in relatively recent water reaching the Jordan aquifer. As such, completing a fracture flow delineation for the Prairie du Chien aquifer is required.

The modified MODFLOW model was analyzed to determine an estimation of outflow from the Prairie du Chien aquifer into the Jordan aquifer across the 10-year delineation areas. This was done using a mass-balance calculation in Groundwater Vistas, determine the sum of the cell-by-cell flows within the delineated area. A summary of the results is provided in Table 5. This summary shows that the model is calculating roughly 18-60% of the water in these cells being comprised of water recharging from the Prairie du Chien formation, depending on the model run. Since these values are estimates, the most conservative values were used and rounded up to the nearest 5%.

The next step of the process was to delineate a fixed radius capture zone for the Prairie du Chien aquifer around each municipal well. This was accomplished using a GIS application developed by the MDH for fracture flow calculations. Tables 6 and 8 show the values used to create the fixed radius calculation for each well for 1-year and 5-year delineations. This calculation takes into account aquifer thickness (based on average thicknesses noted in well logs), aquifer porosity (5.4%, as noted in MDH guidance documents), and the percentage of pumped volume from each well thought to be supplied by the Prairie du Chien (45-65% of the total pumped volume, in this case).

Since the fracture flow radii of some wells overlap, the GIS application was used to calculate modified radii for the overlap areas, apportioning the flow to a larger overall area. For the 5-year fixed-radius delineations, 5-year upgradient extensions were added to create 10-year fracture flow delineations. Since there is some uncertainty in flow directions, a 10-degree flow angle variation was used to encompass possible variations in the flow direction. Due to the close proximity of Wells 5 and 9, these wells were calculated together as one "well" for the sake of the 10-year fracture flow delineation, using a midpoint coordinate. Tables 7 and 9 show the values used for the overlap and upgradient extension calculations.

The completed fracture flow calculations were combined to create a composite fracture-flow delineation area for the Prairie du Chien bedrock, as shown in Figure 2. This is the area that, combined with the 10-year porous flow area delineated in Figure 1, will serve as the wellhead protection area (WHPA) for the Oakdale aquifer wells.

C. Uncertainties relating to the accuracy of the calculated wellhead protection area boundaries

Using computer models to simulate ground-water flow necessarily involves representing a complicated natural system in a simplified manner. These simplifications are a result of incomplete knowledge or understanding of part of the natural system and the limitations of mathematical models implemented in groundwater modeling computer codes. The necessary simplifications give rise to uncertainty in the model results. A reasonable attempt to account for the most significant causes of model uncertainty was made in the delineation of the WHPA. The technical report for the Metropolitan Model (Metropolitan Council, 2009) outlines some of the model uncertainties that exist within the original MODFLOW model. Wherever possible, locally obtained values of hydraulic conductivity were used to more accurately represent conditions in and around the Oakdale wells.

Additional areas of uncertainty not accounted for in the original 2001 delineation analysis were considered for this amended delineation. The chief area of uncertainty was the portion of water entering the Jordan aquifer porous flow capture zones through the overlying Prairie du Chien aquifer. The MDH guidance for calculating wellhead protection areas in fracture flow and solution-weathered settings is designed to account for a large amount of that uncertainty. The additional areas, added to the delineation around the wellhead (and extended in the upgradient direction), add a higher degree of confidence that the delineation accounts for areas within both the Prairie du Chien and Jordan aquifers that supply water to the municipal wells over a 10-year period.

Additionally, uncertainty was further addressed to account for variations in hydraulic conductivity observed in aquifer pumping tests at Oakdale's wells. While Model Run 8 simulated the hydraulic conductivity around each well that most closely represented the observed value at the nearest well tested, Model Run 8b and 8c were also run to simulate the full range of hydraulic conductivity (6.7-23.0 m/d) in the Jordan aquifer over the area of Oakdale's well field. Using this full range of values helps to ensure that variations in conductivity within the well field are fully accounted for. A composite of capture zones from all three modeling runs was used to create the porous flow delineation results shown in Figure 1.

D. Delineation of the DWSMA

The Drinking Water Supply Management Area (DWSMA) is shown on Figure 3. This area includes all of the porous-flow wellhead protection areas, the fracture-flow wellhead protection area, and the surface water drainage delineation. The DWSMA was delineated using a combination of parcel boundaries, street and road centerlines, and municipal boundaries. Any parcel of land either wholly or partially within one of the delineation areas was included within the DWSMA.

The DWSMA represents the area of land that will be considered during the creation of the management plan for Part 2. The vulnerability of the DWSMA is discussed in Chapter 3 of this report.

CHAPTER THREE
VULNERABILITY ASSESSMENT

This chapter documents the vulnerability assessments of the wells and drinking water supply management area (DWSMA) for the City of Oakdale wells listed in Table 1. This assessment was performed in accordance with rules (Minnesota Rule 4720.5210) for preparing and implementing wellhead protection measures for public water supply wells.

The vulnerabilities of the wells were determined by evaluating available information on the 1) geology, 2) well construction, 3) pumping rates, and 3) chemical composition of the well water and comparing these results with the criteria in Minnesota Rule 4720.5550.

The vulnerability of the DWSMA was determined by evaluating available information on 1) the lateral continuity of protective geologic materials overlying the aquifer and 2) the chemical and isotopic composition of well water from the aquifer. The combination of both geologic layering and water chemistry was used to assign the vulnerability levels.

A. Well vulnerability assessment - A vulnerability score was calculated for each well based on factors such as well construction, geology at the well site, and chemical data; higher scores correlate to greater perceived vulnerability. A numeric cutoff (of 45 points) is used to identify vulnerable from non-vulnerable wells (MDH, 1997). Vulnerable wells are also identified based on the presence of contamination, such as nitrate-nitrogen in excess of 10 mg/l, or young (post-1953) water, as indicated by the presence of 1 tritium unit or greater in the well water. The completed well vulnerability assessment worksheets are provided in Appendix C.

All of the municipal wells were determined to be vulnerable, based on a combination of the geologic "L" scores, the presence of tritium in tested wells, and moderate readings of nitrates in historic samples. The tritium levels of Wells 2, 3, 5, 7, and 10 were measured to between 2.0 and 8.6 tritium units. All wells tested for tritium showed levels at 2.0 tritium units or more. While the worksheet scores for several wells were below the 45 point threshold, the presence of tritium above 1.0 tritium unit results in an automatic classification of "vulnerable."

There is nothing that was discovered in the well vulnerability assessment that indicates that the wells themselves are a likely avenue for contamination to reach the aquifer. The wells appear to meet construction standards set forth in the State Well Code. Well vulnerability in Oakdale is mostly indicative of overall aquifer vulnerability.

B. Drinking Water Supply Management Area Vulnerability Assessment - The vulnerability of land parcels located within the drinking water supply management area (DWSMA) for Oakdale was evaluated primarily on the basis of the geologic sensitivity, as determined from well records in County Well Index. Each mapped well from County Well Index was assigned an "L" score based on a GIS application developed by the Minnesota Department of Health. An L-score identifies the amount of geologic protection between the land surface and the aquifer, as identified in each well's geologic log. Each L-score represents 10 feet of low permeability material found above the aquifer. This material may be either be unconsolidated deposits of clay or may be a confining bedrock layer, such as shale. An L-Score of 3, for example, would indicate at least 30 feet of low permeability material above the aquifer in question.

Table 10 displays the L-scores for the wells within (and immediately surrounding) the DWSMA. Other factors also influence the geologic sensitivity of the DWMSA, including the presence of confining bedrock units, including the Decorah Shale, Glenwood Shale, and the basal portion of the St. Peter Sandstone (which acts as a semi-confining layer). The presence of Decorah or

Glenwood results in a lower sensitivity ranking, even when surficial clays are absent. The presence of basal St. Peter results in a moderate sensitivity ranking when other confining units are absent. Using a combination of L-Scores and bedrock geology, a geologic sensitivity rating was given for each well. All of the wells within (and immediately surrounding) the Oakdale DWSMA had a geologic sensitivity of either "low" or "moderate." These sensitivity rankings are shown on Figure 4.

Figure 4 also shows the layout of three geologic cross-sections that intersect the DWSMA. These cross-sections are provided in Figures 5, 6, and 7. The interpretation of the geology indicates the lateral presence of confining geologic areas across all portions of the DWSMA, sometimes with multiple confining units.

However, the presence of tritium in all of Oakdale's Wells that have been tested to date must also be taken into account. This indicates that relatively recent water (less than 60 years old) has been reaching the Jordan aquifer in the Oakdale area. Additionally, the presence of PFCs in the City's wells illustrates than man-made compounds have reached the City's drinking water aquifer within the past 50 years. Therefore, while the geologic sensitivity would appear to indicate "low" vulnerability over large portions of the DWSMA, the water chemistry supports adopting a "moderate" level of vulnerability across the entire DWSMA.

The implications of the assigned vulnerability level will be addressed in greater detail in the amended Part 2 Wellhead Protection Plan. In general, the moderate vulnerability ranking will necessitate an inventory of potential contamination sources within the affected parcels that goes beyond just completing a well inventory.

C. Recommendations – Primary Oakdale Wells 1, 8, and 9 have not been tested for tritium to date. While other data (including PFC contamination) would suggest that the Jordan aquifer is somewhat vulnerable in the areas surrounding these wells, it is recommended that future tritium testing be conducted on wells that have not been tested to date.

REFERENCES

Hydrogeological and Modeling Services Inc., *City of Oakdale Wellhead Protection Plan: Part 1*, September 2002.

Metropolitan Council, *Twin Cities Metropolitan Area Regional Groundwater Flow Model Version 2.00*, *Technical Report in Support of the Metropolitan Area Master Water Supply Plan*, October 2009.

Minnesota Department of Health, *Assessing Well and Aquifer Vulnerability for Wellhead Protection*, February 1997.

Minnesota Department of Health and Minnesota Geological Survey, *Minnesota County Well Index, Version 4.00*.

Minnesota Department of Health, *Guidance for Delineating Wellhead Protection Areas in Fractured and Solution-Weathered Bedrock in Minnesota*, December 2011.

Minnesota Geological Survey, *Geologic Atlas of Washington County, Minnesota*, County Atlas Series C-5, Ed. Lynn Swanson and Gary N. Meyer, University of Minnesota, St. Paul. 1990.

Minnesota Geological Survey, *Bedrock Geology and Structure of the Seven-County Twin Cities Metropolitan Area, Minnesota*, 2000.

TABLES

TABLE 1 - WATER SUPPLY WELL INFORMATION

Well Name	Oakdale 1	Oakdale 2	Oakdale 3	Oakdale 5	Oakdale 6	Oakdale 7	Oakdale 8	Oakdale 9	Oakdale 10
Unique Number	208462	208463	208454	127287	151575	463534	572608	611059	773389
Aquifer	Jordan	Jordan	Jordan	Jordan	Jordan	Jordan	Jordan	Jordan	Jordan
Well Status	Primary	Primary	Primary	Primary	Emergency	Primary	Primary	Primary	Primary
UTM E Coordinate	502671	501964	502651	502842	501705	503536	503925	502513	501854
UTM N Coordinate	4978664	4978427	4983443	4980013	4985787	4979300	4981887	4979760	4983717
Metro Model E Coord	96896	96189	96876	97067	95930	97761	98150	96738	96079
Metro Model N Coord	68682	68445	73461	70031	75805	69318	71905	69778	73735
Casing Depth (feet)	501	458	424	436	387	467	381	441	415
Well Depth (feet)	581	542	510	520	471	563	463	517	501
Pumping Rate (gpm)	800	1000	1000	1000	1400	1000	1000	1200	1000
Date Constructed	1958	1964	1969	1978	1984	1990	1996	2001	2010
Vulnerability*	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable	Vulnerable

* vulnerability status based on review of well construction, geologic materials encountered during drilling, well use, and water quality.

TABLE 2 - WATER SUPPLY WELL USAGE DATA

Well Name		Oakdale 1	Oakdale 2	Oakdale 3	Oakdale 5	Oakdale 7	Oakdale 8	Oakdale 9	Oakdale 10	Total
Unique Number		208462	208463	208454	127287	463534	572608	611059	773389	
Use Status		Primary	Primary	Primary	Primary	Seasonal	Seasonal	Primary	Primary	
Aquifer		Jordan	Jordan	Jordan	Jordan	Jordan	Jordan	Jordan	Jordan	
Historic Pumping Totals (MG/Y)	2009	91.4	95.3	159.2	272.2	25.9	0.1	357.0		975.1
	2010	28.6	60.8	175.4	258.9	1.8	0.0	361.0		884.7
	2011	2.6	93.8	34.4	256.8	1.7	0.2	205.2	305.1	897.9
	2012	59.1	47.0	138.0	170.9	18.2	0.9	320.9	271.4	1007.3
	2013	69.5	28.8	142.1	157.6	6.6	5.2	392.2	135.8	926.0
Projected Rate (MG/Y)	2020	75.0	75.0	150.0	250.0	0.0	0.0	350.0	300.0	1200.0
Modeled Rate for Plan Update (MG/Y)		91.4	95.3	175.4	272.2	25.9	5.2	392.2	305.1	1331.6
Modeled Rate for Plan Update (m^3/day)		948.5	989.0	1820.3	2824.8	268.8	54.0	4070.2	3166.3	13819.1

TABLE 3 - MODELED HIGH CAPACITY WELLS

Well Name	Unique Number	UTM E COORD	UTM N COORD	Aquifer	DNR SWUDS Data (MG/Y)					Modeled Average Rate (MG/Y)	Modeled Average Rate (m^3/d)
					2007	2008	2009	2010	2011		
White Bear Lake 1	014005	499943	4987842	CJDN	156.1	151.3	166.7	43.9	57.3	115.1	1194
North St. Paul 5	112229	500191	4983353	CJDN	115.2	105.6	120.1	81.1	60.8	96.6	1002
3M Company 3	127256	436128	4995528	OPCJ	8.2	6.7	5.5	3.9	5.6	6.0	62
SPRWS C	127292	492435	4988376	OPCJ	867.6	451.5	331.0	481.0	.0	426.2	4423
Manitou Ridge Golf Club	127293	499939	4987254	OPDC	30.2	28.8	28.6	19.5	16.1	24.6	256
SPRWS B	133312	492319	4988169	OPCJ	3.0	.0	.0	.0	.0	0.6	6
Woodbury 5	150353	504632	4974109	CJDN	147.3	79.2	98.8	85.2	92.4	100.6	1044
Woodbury 6	151569	504254	4974591	CJDN	176.3	118.8	125.6	99.4	116.2	127.3	1321
SPRWS E	151579	491975	4987023	OPCJ	.0	.0	4.7	.0	.0	0.9	10
SPRWS D	151583	492542	4988214	OPCJ	305.7	197.8	123.2	567.9	295.2	298.0	3092
St. Paul Priory	200442	500789	4982492	CJDN				3.6	4.0	3.8	39
Ramsey County Parks	200443	498452	4982734	OPCJ	16.8	16.6	21.1	15.3	13.0	16.6	172
White Bear Lake 3	205733	500180	4987745	OPCJ	377.8	375.8	386.2	396.7	379.5	383.2	3977
North St. Paul 4	205744	499437	4985671	CJDN	96.6	94.5	98.7	100.5	131.4	104.3	1083
3M Company 1	207969	499725	4977747	OPCJ	51.7	35.5	47.5	28.1	20.9	36.7	381
Woodbury 4	208005	504436	4974356	OPCJ	138.0	96.6	121.4	79.9	101.4	107.5	1115
North St. Paul 1	208222	500053	4984951	OPCJ	72.5	62.5	72.9	78.0	65.6	70.3	730
North St. Paul 2	208223	499999	4984952	OPCJ	93.3	84.4	74.1	73.3	51.6	75.3	782
North St. Paul 3	208224	500396	4984238	CJDN	120.4	124.6	104.5	90.6	110.7	110.2	1143
Woodbury 1	208420	501578	4976429	CJDN	2.5	3.0	1.0	3.3	1.0	2.2	22
Woodbury 2	208422	504826	4973887	CJDN	55.3	61.5	35.3	36.0	37.5	45.1	468
Woodbury 3	208423	504438	4974114	CJDN	73.1	81.9	101.5	55.3	97.5	81.9	850
Cimarron Park 1	208468	510082	4978350	CJDN	4.3	3.6	5.3	29.8	19.5	12.5	130
Mahtomedi 3	208497	503897	4990801	OPCJ	174.6	94.9	114.3	89.5	112.5	117.2	1216
Mahtomedi 4	208506	503424	4990174	CJDN	73.6	56.1	70.1	68.9	47.7	63.3	657
White Bear Lake 4	226566	499567	4987709	OPCJ	411.7	448.7	399.9	444.8	444.9	430.0	4462
Mahtomedi 5	433255	501725	4988566	OPCJ	67.5	145.6	92.7	45.3	45.1	79.2	822
Woodbury 7	433281	503964	4974693	CJDN	152.5	178.4	161.2	104.2	142.6	147.8	1534
Woodbury 9	463539	504912	4974413	CJDN	169.3	210.6	154.0	86.4	124.5	149.0	1546
Woodbury 8	509051	505140	4973986	CJDN	243.4	234.6	186.8	169.6	191.6	205.2	2130
Woodbury 10	541763	506221	4974006	CJDN	309.0	271.3	259.6	203.1	223.0	253.2	2628
Woodbury 11	563000	505388	4974525	CJDN	270.1	199.7	218.8	215.7	214.5	223.8	2322
Cimarron Park 2	564213	510098	4978335	CJDN	60.9	64.9	58.2	25.9	33.5	48.7	505
Oak Marsh Ltd Partnership	570405	505126	4978087	OPCJ	20.1	23.5	3.9	.0	23.4	14.2	147
Woodbury 13	593657	505548	4973269	CJDN	294.8	292.8	269.2	215.6	136.8	241.8	2510
Woodbury 12	596646	505592	4974076	CJDN	295.8	261.8	279.6	158.9	225.9	244.4	2536
Lake Elmo 2	603085	510832	4986116	OPCJ	111.1	100.7	103.3	80.4	89.2	96.9	1006

TABLE 3 - MODELED HIGH CAPACITY WELLS

Well Name	Unique Number	UTM E COORD	UTM N COORD	Aquifer	DNR SWUDS Data (MG/Y)					Modeled Average Rate (MG/Y)	Modeled Average Rate (m^3/d)
					2007	2008	2009	2010	2011		
Woodbury 14	611094	506488	4974207	CJDN	228.2	297.7	257.5	256.9	142.4	236.5	2455
Ramsey County Parks	668484	501042	4974986	OSTP-CJDN	20.0	17.5	19.3	10.4	14.9	16.4	170
Woodbury 15	676415	509247	4972922	CJDN	169.1	187.5	199.9	236.2	265.9	211.7	2197
SPRWS G	706802	492028	4986692	OPCJ	67.3	157.1	.0	63.9	.0	57.7	598
SPRWS F	706803	492012	4987232	OPCJ	166.9	750.0	.0	124.0	.0	208.2	2160
Woodbury 16	706811	509709	4973545	CJDN	155.6	210.0	304.2	189.4	278.6	227.6	2362
Mahtomedi 6	753675	502367	4987078	CJDN	N/O	N/O	26.7	51.7	50.8	43.1	447
Hillcrest Country Club	603061	4981508	499548	OPCJ	34.5	28.1	27.9	21.9	20.5	26.6	276
Keller Golf Course	200453	4983582	495403	OPCJ	26.0	22.7	22.6	11.7	16.6	19.9	207
Jesuit Retreat House	208429	4985658	505092	OPDC	0.7	0.8	1.0	0.9	0.9	0.9	9
Woodbury 17	759572	503948	4974061	CJDN	N/O	N/O	71.3	220.2	186.8	159.4	1655

N/O = Well not yet online during specified year. Average pumping rate is calculated based only on years online.

TABLE 4 - JORDAN AQUIFER PARAMETERS

PARAMETER	VALUE	SOURCE
Aquifer Material	Sandstone	Well Boring Records
Transmissivity	1,885 ft^2/day to 6,723 ft^2/day	Pumping Tests from Wells 5, 9, and 10
Horizontal Hydraulic Conductivity	21.9 ft/day to 75.5 ft/day	Pumping Tests from Wells 5, 9, and 10, along with aquifer thickness information from County Well Index
Stratigraphic Bottom Elevation (at Oakdale's wells)	147.8m to 166.7m	Bottom elevation range observed in Oakdale's municipal well logs
Stratigraphic Top Elevation (at Oakdale's wells)	177.7m to 191.1m	Top elevation range observed in Oakdale's municipal well logs
Aquifer Thickness	80m to 98m	Average thickness range observed in Oakdale's municipal well logs
Aquifer Porosity	0.20	Estimated
Hydraulic Confinement	Confined	Well Boring Records
Groundwater Flow Field	South-Southwest	Washington County Geologic Atlas

TABLE 5: MASS BALANCE SUMMARY FOR GROUNDWATER CAPTURE ZONES

Model Run 8

Well Capture Zone	Well 1	Well 2	Well 3	Well 5	Well 7	Well 8	Well 9	Well 10
Well Discharge from Jordan (m^3/d)	948.5	989	1820.3	2824.8	268.8	54.0	4070.2	3166.3
Modeled Recharge from Prairie du Chien (m^3/d)	322.3	341.7	859.6	1233.1	121.1	16.4	2124.8	1489.2
Percentage of Capture Area Recharged by Prairie du Chien	34.0%	34.6%	47.2%	43.7%	45.1%	30.4%	52.2%	47.0%

Model Run 8b

Well Capture Zone	Well 1	Well 2	Well 3	Well 5	Well 7	Well 8	Well 9	Well 10
Well Discharge from Jordan (m^3/d)	948.5	989	1820.3	2824.8	268.8	54.0	4070.2	3166.3
Modeled Recharge from Prairie du Chien (m^3/d)	301.8	326.6	327.2	831.5	69.5	21.7	1440.7	620.7
Percentage of Capture Area Recharged by Prairie du Chien	31.8%	33.0%	18.0%	29.4%	25.9%	40.2%	35.4%	19.6%

Model Run 8c

Well Capture Zone	Well 1	Well 2	Well 3	Well 5	Well 7	Well 8	Well 9	Well 10
Well Discharge from Jordan (m^3/d)	948.5	989	1820.3	2824.8	268.8	54.0	4070.2	3166.3
Modeled Recharge from Prairie du Chien (m^3/d)	531.3	561.2	871.2	1431.2	109.6	15.8	2559.5	1507.2
Percentage of Capture Area Recharged by Prairie du Chien	56.0%	56.7%	47.9%	50.7%	40.8%	29.3%	62.9%	47.6%

Rates Used for Fracture Flow Calculations

Well Capture Zone	Well 1	Well 2	Well 3	Well 5	Well 7	Well 8	Well 9	Well 10
Well Discharge from Jordan (m^3/d)	948.5	989	1820.3	2824.8	268.8	54.0	4070.2	3166.3
Percentage of Capture Area Recharged by Prairie du Chien	60.0%	60.0%	50.0%	55.0%	45.0%	40.0%	65.0%	50.0%
Discharge Rate Used for Fracture Flow Calculation (m^3/d)	569.1	593.4	910.2	1553.6	121.0	21.6	2645.6	1583.2

TABLE 6 - CALCULATION OF 1-YEAR FIXED RADII FRACTURE FLOW DELINEATIONS

Well = 1				
X = 502,671.000, Y = 4,978,664.000				
1 Year Pumping Volume (365 days)				
Pumping Volume (Q):	569.1 m^3/day	20097.6 ft^3/day	104.4 gpm	150340.3 gal/day
Water Producing Zone Thickness (L):	42.1 m	138.1 ft.		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	177.2 m	581.5 ft.		
Well = 2				
X = 501,964.000, Y = 4,978,427.000				
1 Year Pumping Volume (365 days)				
Pumping Volume (Q):	593.4 m^3/day	20955.7 ft^3/day	108.9 gpm	156759.7 gal/day
Water Producing Zone Thickness (L):	42.1 m	138.1 ft.		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	181.0 m	593.8 ft.		
Well = 3				
X = 502,651.000, Y = 4,983,443.000				
1 Year Pumping Volume (365 days)				
Pumping Volume (Q):	910.2 m^3/day	32143.4 ft^3/day	167.0 gpm	240449.4 gal/day
Water Producing Zone Thickness (L):	40.2 m	131.9 ft.		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	229.4 m	752.5 ft.		
Well = 7				
X = 503,536.000, Y = 4,979,300.000				
1 Year Pumping Volume (365 days)				
Pumping Volume (Q):	121.0 m^3/day	4273.1 ft^3/day	22.2 gpm	31964.8 gal/day
Water Producing Zone Thickness (L):	40.5 m	132.9 ft.		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	83.3 m	273.4 ft.		
Well = 8				
X = 503,925.000, Y = 4,981,887.000				
1 Year Pumping Volume (365 days)				
Pumping Volume (Q):	21.6 m^3/day	762.8 ft^3/day	4.0 gpm	5706.1 gal/day
Water Producing Zone Thickness (L):	41.1 m	134.8 ft.		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	34.9 m	114.7 ft.		

TABLE 6 - CALCULATION OF 1-YEAR FIXED RADII FRACTURE FLOW DELINEATIONS

Well = 10 X = 501,854.000, Y = 4,983,717.000 1 Year Pumping Volume (365 days) ----------				
Pumping Volume (Q):	1583.2 m^3/day	55910.2 ft^3/day	290.4 gpm	418237.2 gal/day
Water Producing Zone Thickness (L):	42.1 m	138.1 ft.		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	295.6 m	969.8 ft.		

TABLE 7 - CALCULATION OF 1-YEAR OVERLAP AREA FRACTURE FLOW DELINEATIONS

Well = 5				
X = 502,842.000, Y = 4,980,013.000				
1 Year Pumping Volume (365 days)				
Pumping Volume (Q):	1553.6 m^3/day	54864.9 ft^3/day	285.0 gpm	410417.7 gal/day
Water Producing Zone Thickness (L):	41.5 m	136.2 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	294.9 m	967.6 ft		
New Radius:	313.9 m	1029.8 ft		
New Pumping Volume (Q): *	1759.6 m^3/day	62139.0 ft^3/day	322.8 gpm	464832.0 gal/day
Well = 9				
X = 502,513.000, Y = 4,979,760.000				
1 Year Pumping Volume (365 days)				
Pumping Volume (Q):	2645.6 m^3/day	93428.5 ft^3/day	485.3 gpm	698893.6 gal/day
Water Producing Zone Thickness (L):	41.5 m	136.2 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	384.9 m	1262.7 ft		
New Radius:	409.6 m	1343.8 ft		
New Pumping Volume (Q): *	2996.4 m^3/day	105815.5 ft^3/day	549.7 gpm	791554.8 gal/day
OVERLAP SUMMARY INFORMATION				
Original (CFR) Area for Well 5:	273283.9 m^2	2941600.1 ft^2		
New (CFR) Area for Well 5:	309516.6 m^2	3331605.7 ft^2		
Original (CFR) Area for Well 9:	465370.6 m^2	5009202.6 ft^2		
New (CFR) Area for Well 9:	527070.7 m^2	5673336.7 ft^2		
Overlap Area to Well 5:	36232.7 m^2	390005.6 ft^2		
Overlap Area to Well 9:	61700.1 m^2	664134.1 ft^2		
Total Overlap Area:	97932.9 m^2	1054139.7 ft^2		
* = New Pumping Volumes (Q) if needed for additional overlap computations with another well.				

TABLE 8 - CALCULATION OF 5-YEAR FIXED RADII FRACTURE FLOW DELINEATIONS

Well = 8 X = 503,925.000, Y = 4,981,887.000 5 Year Pumping Volume (1825 days) ----------				
Pumping Volume (Q):	21.6 m^3/day	762.8 ft^3/day	4.0 gpm	5706.1 gal/day
Water Producing Zone Thickness (L):	41.1 m	134.8 ft.		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	78.1 m	256.4 ft.		
1st Bearing from Well = 20° from North.				

TABLE 9 - CALCULATION OF 5-YEAR OVERLAP AREA AND UPGRADIENT EXTENSION FRACTURE FLOW DELINEATIONS

Well = 3				
X = 502,651.000, Y = 4,983,443.000				
5 Year Pumping Volume (1825 days)				
Pumping Volume (Q):	910.2 m^3/day	32143.4 ft^3/day	167.0 gpm	240449.4 gal/day
Water Producing Zone Thickness (L):	40.2 m	131.9 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	512.9 m	1682.7 ft		
New Radius:	533.9 m	1751.7 ft		
New Pumping Volume (Q): *	986.3 m^3/day	34832.4 ft^3/day	180.9 gpm	260564.4 gal/day
Well = 10				
X = 501,854.000, Y = 4,983,717.000				
5 Year Pumping Volume (1825 days)				
Pumping Volume (Q):	1583.2 m^3/day	55910.2 ft^3/day	290.4 gpm	418237.2 gal/day
Water Producing Zone Thickness (L):	42.1 m	138.1 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	661.0 m	2168.6 ft		
New Radius:	688.1 m	2257.5 ft		
New Pumping Volume (Q): *	1715.6 m^3/day	60587.4 ft^3/day	314.7 gpm	453225.2 gal/day
OVERLAP SUMMARY INFORMATION				
Original (CFR) Area for Well 3:	826425.4 m^2	8895560.1 ft^2		
New (CFR) Area for Well 3:	895560.8 m^2	9639726.4 ft^2		
Original (CFR) Area for Well 10:	1372608.1 m^2	14774616.1 ft^2		
New (CFR) Area for Well 10:	1487434.9 m^2	16010600.3 ft^2		
Overlap Area to Well 3:	69135.4 m^2	744166.3 ft^2		
Overlap Area to Well 10:	114826.8 m^2	1235984.2 ft^2		
Total Overlap Area:	183962.2 m^2	1980150.6 ft^2		
* = New Pumping Volumes (Q) if needed for additional overlap computations with another well.				
UP-GRADIENT EXTENSION (UGE)				
(area beyond the New Areas of both Wells)				
(area beyond the New Areas of both Wells)				
Bearing from Well 3 = 22° from North +/- 10°.				
Bearing from Well 10 = 22° from North +/- 10°.				
Up-Gradient Extension Area:	2235936.3 m^2	24067394.3 ft^2		
Up-Gradient Intersection Area:	210191.6 m^2	2262481.0 ft^2		

TABLE 9 - CALCULATION OF 5-YEAR OVERLAP AREA AND UPGRADIENT EXTENSION FRACTURE FLOW DELINEATIONS

Well = 1				
X = 502,671.000, Y = 4,978,664.000				
5 Year Pumping Volume (1825 days)				
Pumping Volume (Q):	586.0 m^3/day	20694.4 ft^3/day	107.5 gpm	154804.8 gal/day
Water Producing Zone Thickness (L):	42.1 m	138.1 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	402.1 m	1319.4 ft		
New Radius:	408.3 m	1339.5 ft		
New Pumping Volume (Q): *	604.1 m^3/day	21332.5 ft^3/day	110.8 gpm	159577.9 gal/day
Wells = 5 and 9				
X = 502,678.000, Y = 4,979,887.000				
5 Year Pumping Volume (1825 days)				
Pumping Volume (Q):	4199.2 m^3/day	148293.3 ft^3/day	770.4 gpm	1109311.3 gal/day
Water Producing Zone Thickness (L):	41.5 m	136.2 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	1084.3 m	3557.3 ft		
New Radius:	1100.8 m	3611.7 ft		
New Pumping Volume (Q): *	4328.7 m^3/day	152865.6 ft^3/day	794.1 gpm	1143514.3 gal/day
OVERLAP SUMMARY INFORMATION				
Original (CFR) Area for Well 1:	508052.3 m^2	5468623.7 ft^2		
New (CFR) Area for Well# 1:	523716.8 m^2	5637235.8 ft^2		
Original (CFR) Area for Wells 5 and 9:	3693272.3 m^2	39754013.6 ft^2		
New (CFR) Area for Wells 5 and 9:	3807145.6 m^2	40979734.6 ft^2		
Overlap Area to Well 1:	15664.6 m^2	168612.1 ft^2		
Overlap Area to Wells 5 and 9:	113873.3 m^2	1225721.0 ft^2		
Total Overlap Area:	129537.9 m^2	1394333.1 ft^2		
* = New Pumping Volumes (Q) if needed for additional overlap computations with another well.				
UP-GRADIENT EXTENSION (UGE)				
(area beyond the New Areas of both Wells)				
(area beyond the New Areas of both Wells)				
Bearing from Well 1 = 20° from North +/- 10°.				
Bearing from Wells 5 and 9 = 20° from North +/- 10°.				
Up-Gradient Extension Area:	4886317.4 m^2	52595832.3 ft^2		

TABLE 9 - CALCULATION OF 5-YEAR OVERLAP AREA AND UPGRADIENT EXTENSION FRACTURE FLOW DELINEATIONS

Well = 1				
X = 502,671.000, Y = 4,978,664.000				
5 Year Pumping Volume (1825 days)				
Pumping Volume (Q):	604.1 m^3/day	21333.6 ft^3/day	110.8 gpm	159586.3 gal/day
Water Producing Zone Thickness (L):	42.1 m	138.1 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	408.3 m	1339.6 ft		
New Radius:	411.2 m	1349.0 ft		
New Pumping Volume (Q): *	612.6 m^3/day	21634.8 ft^3/day	112.4 gpm	161839.7 gal/day
Well = 2				
X = 501,964.000, Y = 4,978,427.000				
5 Year Pumping Volume (1825 days)				
Pumping Volume (Q):	593.4 m^3/day	20955.7 ft^3/day	108.9 gpm	156759.7 gal/day
Water Producing Zone Thickness (L):	42.1 m	138.1 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	404.7 m	1327.7 ft		
New Radius:	407.5 m	1337.0 ft		
New Pumping Volume (Q): *	601.8 m^3/day	21251.6 ft^3/day	110.4 gpm	158973.2 gal/day
OVERLAP SUMMARY INFORMATION				
Original (CFR) Area for Well 1:	523744.7 m^2	5637535.1 ft^2		
New (CFR) Area for Well 1:	531140.1 m^2	5717138.5 ft^2		
Original (CFR) Area for Well 2:	514467.9 m^2	5537681.4 ft^2		
New (CFR) Area for Well 2:	521732.3 m^2	5615874.8 ft^2		
Overlap Area to Well 1:	7395.4 m^2	79603.4 ft^2		
Overlap Area to Well 2:	7264.4 m^2	78193.4 ft^2		
Total Overlap Area:	14659.8 m^2	157796.8 ft^2		
* = New Pumping Volumes (Q) if needed for additional overlap computations with another well.				
UP-GRADIENT EXTENSION (UGE)				
(area beyond the New Areas of both Wells)				
(area beyond the New Areas of both Wells)				
Bearing from Well 1 = 20° from North +/- 10°.				
Bearing from Well 2 = 20° from North +/- 10°.				
Up-Gradient Extension Area:	1102132.0 m^2	11863238.4 ft^2		
Up-Gradient Intersection Area:	13484.0 m^2	145140.9 ft^2		

TABLE 9 - CALCULATION OF 5-YEAR OVERLAP AREA AND UPGRADIENT EXTENSION FRACTURE FLOW DELINEATIONS

Well = 7				
X = 503,536.000, Y = 4,979,300.000				
5 Year Pumping Volume (1825 days)				
Pumping Volume (Q):	121.0 m^3/day	4273.1 ft^3/day	22.2 gpm	31964.8 gal/day
Water Producing Zone Thickness (L):	40.5 m	132.9 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	186.3 m	611.3 ft		
New Radius:	188.1 m	617.1 ft		
New Pumping Volume (Q): *	123.3 m^3/day	4355.1 ft^3/day	22.6 gpm	32578.7 gal/day
Wells = 5 and 9				
X = 502,678.000, Y = 4,979,887.000				
5 Year Pumping Volume (1825 days)				
Pumping Volume (Q):	4328.7 m^3/day	152866.6 ft^3/day	794.1 gpm	1143521.6 gal/day
Water Producing Zone Thickness (L):	41.5 m	136.2 ft		
Effective Porosity (n):	0.05			
Original (CFR) Radius:	1100.8 m	3611.7 ft		
New Radius:	1111.4 m	3646.2 ft		
New Pumping Volume (Q): *	4411.8 m^3/day	155802.4 ft^3/day	809.4 gpm	1165482.9 gal/day
OVERLAP SUMMARY INFORMATION				
Original (CFR) Area for Well 7:	109049.4 m^2	1173796.7 ft^2		
New (CFR) Area for Well 7:	111143.7 m^2	1196339.4 ft^2		
Original (CFR) Area for Wells 5 and 9:	3807169.9 m^2	40979995.9 ft^2		
New (CFR) Area for Wells 5 and 9:	3880286.7 m^2	41767017.8 ft^2		
Overlap Area to Well 7:	2094.3 m^2	22542.8 ft^2		
Overlap Area to Wells 5 and 9:	73116.8 m^2	787021.9 ft^2		
Total Overlap Area:	75211.1 m^2	809564.7 ft^2		
* = New Pumping Volumes (Q) if needed for additional overlap computations with another well.				
UP-GRADIENT EXTENSION (UGE)				
(area beyond the New Areas of both Wells)				
(area beyond the New Areas of both Wells)				
Bearing from Well 7 = 20° from North +/- 10°.				
Bearing from Wells 5 and 9 = 20° from North +/- 10°.				
Up-Gradient Extension Area:	5039428.0 m^2	54243898.5 ft^2		

TABLE 10 - WELL VULNERABILITY RANKINGS NEAR DWSMA

UNIQUE NUMBER	WELL NAME	ELEVATION (FT)	DEPTH (FT)	CASING DEPTH (FT)	DEPTH TO BEDROCK (FT)	FIRST BEDROCK	LAST STRATIGRAPHIC LAYER	UTME COORD	UTMN COORD	AQUIFER	ST. PETER PRESENT?	GLENWOOD PRESENT?	DECORAH PRESENT?	L SCORE	GEOLOGIC SENSITIVITY
112433	FRANTA, FRANK	980	187	125	76	OSTP	OPDC	504107	4984702	OSPC	Yes	No	No	4	L
112538	BELISLE, LOUIS C.	990	217	190	61	ODCR	OSTP	501606	4978152	OSTP	Yes	Yes	Yes	2	L
122013	GAROFALO, DON	976	151	147	45	OSTP	OSTP	504033	4984166	OSTP	Yes	No	No	3	L
127287	OAKDALE 5	1030	520	436	93	OPVL	CSTL	502842	4980013	CJDN	Yes	Yes	No	0	M
134754	HANSON, ERIC	981	138	134	15	OPVL	OSTP	504216	4982373	OSTP	Yes	Yes	No	1	L
142304	MORRIS, ROBERT	1012	80	75	65	OSTP	OSTP	503237	4983649	OSTP	Yes	No	No	5	L
154476	EDER, RICHARD & JANET	945	172	81	70	OSTP	OSTP	504895	4982087	OSTP	Yes	No	No	3	L
174298	DREHER, BOB	1053	133	110	102	OPVL	OPVL	503845	4978755	OPVL	Yes	Yes	No	5	L
182682	KAUFMAN, BARRY	968	200	155	93	OSTP	OSTP	503670	4985359	OSTP	Yes	No	No	3	L
182774	PRIMOLI, FRED	977	185	160	125	OSTP	OSTP	503786	4985361	OSTP	Yes	No	No	2	L
182930	DANISH, TOM	971	170	166	60	OSTP	OSTP	504221	4984163	OSTP	Yes	No	No	5	L
190333	3M NO.1101 PARK	1030	78	78	66	ODCR	OPVL	502794	4983548	OPVL	Yes	Yes	Yes	4	L
190334	3M NO.6103 FARM	1014	106	106	102	OPVL	OPVL	501047	4981331	OPVL	Yes	Yes	No	5	L
190335	3M NO.6102 N.S.P.	988	105	93	92	OPVL	OPVL	501194	4981749	OPVL	Yes	Yes	No	0	M
190337	3M NO.1102 CONDO	1024	119	107	96	ODCR	OPVL	502160	4983656	OPVL	Yes	Yes	Yes	4	L
196717	3-M NO.5102	978	35	27	25	OPVL	OPVL	504017	4982236	OPVL	Yes	Yes	No	0	M
196718	3-M NO. 5201	975	47	40	40	OSTP	OSTP	504060	4982224	OSTP	Yes	No	No	0	M
199508	BODEY, JOHN	1061	114	108	103	OPVL	OPVL	504603	4979454	OPVL	Yes	Yes	No	0	M
200440	CROSSLY, CLYDE	1005	200	180	131	OSTP	OSTP	501191	4983690	OSTP	Yes	No	No	0	M
200874	NORTHERN STATES POWER	995	523	91	91	OPVL	CSTL	501140	4981629	CJDN	Yes	Yes	No	6	L
208233	EUROPEAN HEALTH SPA	985	285	208	40	ODCR	OSTP	500680	4978676	OSTP	Yes	Yes	Yes	5	L
208433	ZAHLER, ED	1025	127	121	67	ODCR	OSTP	501764	4984133	INDT	Yes	Yes	Yes	7	L
208454	OAKDALE 3	1035	510	424	90	OPVL	CSTL	502651	4983443	CJSL	Yes	Yes	No	3	L
208462	OAKDALE 1	1095	581	501	159	OPVL	CJDN	502683	4978650	CJDN	Yes	Yes	No	6	L
208463	OAKDALE 2	1022	542	458	85	ODCR	CSTL	501964	4978427	CJDN	Yes	Yes	Yes	7	L
208464	JUNEAU, WALTER	982	193	148	65	OPVL	OSTP	501707	4978027	OSTP	Yes	Yes	No	5	L
208465	LANDFALL TERRACE 3	1010	517	438	57	ODCR	CJDN	502070	4977626	CJDN	Yes	Yes	Yes	9	L
225748		993	129	0	60	ODCR	OPVL	500977	4980312	OPVL	Yes	Yes	Yes	7	L
225750	PERSSON	1004	172	82	0	NRCD	OSTP	501183	4977837	OPSP	Yes	No	No	0	M
231863	WHISPERING OAKS MHP 1	1011	265	176	81	OPVL	OPDC	502997	4984885	OSPC	Yes	Yes	No	6	L
233583		1024	140	0	140	OPVL	OPVL	500848	4979582		Yes	Yes	No	0	M
233833	WERDEN, PATRICIA	1008	93	0	62	ODCR	OPVL	501183	4979164		Yes	Yes	Yes	3	L
233881	PEARL, HAROLD	1003	136	0	70	ODCR	OSTP	500789	4978639		Yes	Yes	Yes	3	L
233916	HOWARD, R.L.	1008	100	0	100	OPVL	OPVL	501058	4979123		Yes	Yes	No	0	M
235516	ROBINSON, JEFFREY	1010	80	68	58	ODCR	OPVL	502671	4982868	OPVL	Yes	Yes	Yes	1	L
235519	HEI, JACK	1020	142	123	122	OPVL	OSTP	501542	4981478	OPSP	Yes	Yes	No	0	M
235520	ARNDT, STANLEY	1022	147	127	126	OPVL	OSTP	501379	4981492	OPSP	Yes	Yes	No	0	M
235618	3-M NO. 6202	1003	150	128	92	OPVL	OSTP	500930	4981330	OSTP	Yes	Yes	No	1	L
235622		1010	288	237	95	OPVL	OPDC	501353	4983359	OSPC	Yes	Yes	No	1	L
242983	BUCKLES, PETER	997	142	68	26	ODCR	OSTP	501292	4985550	OPSP	Yes	Yes	Yes	3	L
243440	KNAUFF, MARGUERITE	1010	96	91	56	ODCR	ODCR	501682	4978279	ODCR	Yes	Yes	Yes	3	L
243461		995	121	88	60	ODCR	OSTP	501583	4978383	OPSP	Yes	Yes	Yes	2	L
243759		1010	72	0	62	ODCR	ODCR	501999	4978059	ODCR	Yes	Yes	Yes	1	L
244351		980	103	78	54	ODCR	OPVL	501344	4978385	OPVL	Yes	Yes	Yes	2	L
244648	HOUSER, JIM	995	138	85	50	ODCR	OSTP	501277	4977890	MTPL	Yes	Yes	Yes	3	L
244659	HARRIS, CAROLYN	1049	178	124	116	OPVL	OSTP	503409	4981637	OPSP	Yes	Yes	No	0	M
247095	RR-3	996	91	0	90	OPVL	OPVL	501189	4981652		Yes	Yes	No	0	M
247185		1034	166	146	102	OPVL	OSTP	502850	4981863	OSTP	Yes	Yes	No	1	L
248860	6053 10TH ST. N.	993	83	81	61	ODCR	ODCR	501286	4978833	ODCR	Yes	Yes	Yes	2	L

TABLE 10 - WELL VULNERABILITY RANKINGS NEAR DWSMA

UNIQUE NUMBER	WELL NAME	ELEVATION (FT)	DEPTH (FT)	CASING DEPTH (FT)	DEPTH TO BEDROCK (FT)	FIRST BEDROCK	LAST STRATIGRAPHIC LAYER	UTME COORD	UTMN COORD	AQUIFER	ST. PETER PRESENT?	GLENWOOD PRESENT?	DECORAH PRESENT?	L SCORE	GEOLOGIC SENSITIVITY
248861	6065 10TH ST. N.	995	127	85	62	ODCR	OSTP	501319	4978806	MTPL	Yes	Yes	Yes	2	L
255284	IMATION MW	1005	144	0	37	OPVL	OSTP	504367	4982964	OSTP	Yes	Yes	No	1	L
255297	NYBLOM, RANDY	1070	161	144	143	OPVL	OPVL	502782	4981197	OPVL	Yes	Yes	No	0	M
255348	AUGE, MICHELE	1012	205	137	65	OPVL	OSTP	503958	4981777	OSTP	Yes	Yes	No	1	L
256146		1040	147	144	144	OSTP	OSTP	502842	4981830	OSTP	Yes	No	No	0	M
256153		989	81	58	45	ODCR	OPVL	501611	4985276	ODPL	Yes	Yes	Yes	1	L
256267	STIPE, BRUCE	1025	293	258	115	ODCR	OSTP	501450	4980450	OSTP	Yes	Yes	Yes	1	L
256270		1027	197	124	97	ODCR	OSTP	501261	4980234	MTPL	Yes	Yes	Yes	2	L
257018		1025	112	0	95	ODCR	ODCR	501159	4979876	ODCR	Yes	Yes	Yes	1	L
257354		1028	130	123	123	OPVL	OPVL	501745	4981065	OPVL	Yes	Yes	No	0	M
257393		1019	93	82	79	ODPL	ODPL	503036	4982101	ODPL	Yes	Yes	Yes	0	M
257397	TICKNER, JOHN	1020	153	146	64	OPVL	OSTP	503793	4981997	OSTP	Yes	Yes	No	1	L
270045	DELANEY, JOE	1051	195	168	127	OPVL	OSTP	503314	4981493	OSTP	Yes	Yes	No	1	L
270259	VANG, CHOW	1002	188	107	51	ODCR	OSTP	501147	4978084	OPSP	Yes	Yes	Yes	5	L
271817	SHIVERS, CHRISTINA	1012	87	65	49	ODCR	OSTP	503774	4982053	OPSP	Yes	Yes	Yes	1	L
407062	SWENSON, DALE	983	141	140	53	OSTP	OSTP	504056	4984786	OSTP	Yes	No	No	1	L
435130	JACOT, LOREN	965	156	112	74	OSTP	OSTP	504252	4984467	OSTP	Yes	No	No	0	M
440554	CERNEY, JIM & CINDY	991	141	127	25	OPVL	OSTP	504460	4983168	OSTP	Yes	Yes	No	0	M
463534	OAKDALE 7	1078	563	467	137	OPVL	CSTL	503536	4979300	CJDN	Yes	Yes	No	0	M
471065	FRANKLIN, WILLIAM & HENRY, SUSAN	963	175	158	94	OSTP	OPDC	504999	4982040	OSPC	Yes	No	No	5	L
478956	ARMSTRONG, TOM	1069	335	287	195	OSTP	OPDC	504891	4979638	OPDC	Yes	No	No	14	L
512491	ARMSTRONG, TOM	1065	286	264	180	OSTP	OPDC	504871	4979835	OPDC	Yes	No	No	17	L
526346	STEINER, MARK & DEBRA	975	165	111	60	OSTP	OSTP	504026	4984376	OSTP	Yes	No	No	1	L
546293	TAYLOR, PHIL	945	165	160	110	OSTP	OPDC	504116	4984815	OPDC	Yes	No	No	0	M
569782	PRUDHOMME, GEORGE T. & ANTOINETT	1012	240	225	48	OPVL	OPDC	504542	4981475	OSPC	Yes	Yes	No	1	L
569978	CHU-YAN-HAU, HEUKY & MAYSONG	1019	216	170	51	OPVL	OSTP	504491	4981388	OSTP	Yes	Yes	No	4	L
572608	OAKDALE 8	1010	463	381	58	OPVL	CJDN	503925	4981887	CJDN	Yes	Yes	No	0	M
575072		1020	215	157	55	OPVL	OSTP	504592	4980691	OSTP	Yes	Yes	No	2	L
575148	LESSARD, DAVID J. & MICHELLE L.	968	220	182	66	OSTP	OPDC	504453	4981814	OSPC	Yes	No	No	4	L
575204		1004	220	168	40	OPVL	OSTP	504737	4980541	OSTP	Yes	Yes	No	3	L
588139	HELLER, DARREN L. & HEATHER K.	978	220	205	22	OPVL	OPDC	504584	4981852	OPDC	Yes	Yes	No	1	L
590079	TERNES, JIM & JODY	1020	240	220	63	OPSP	OSTP	504594	4980803	OSTP	Yes	Yes	No	0	M
594563	MINNESOTA DEPARTMENT OF	1023	20	10	0		QLUU	503073	4982829	QWTA	NA	NA	NA	3	L
597087	OAKDALE GOLF & TENNIS	971	285	195	30	OPVL	OPDC	502534	4985598	OSPC	Yes	Yes	No	1	L
599954	PETERSON, BRUCE	1023	280	245	68	OPVL	OPDC	504522	4980767	OPDC	Yes	Yes	No	0	M
611059	OAKDALE 9	1034	517	441	80	ODCR	CSTL	502513	4979760	CJDN	Yes	Yes	Yes	1	L
616945	ROTH, DONALD & ANNE	1010	231	160	65	OGWD	OSTP	504643	4981496	OSTP	Yes	Yes	No	1	L
652406	MN/DOT	1017	28	28	0		QPUG	502912	4982834		NA	NA	NA	2	L
686284	OAKDALE TW	1023	470	255	64	OPVL	CJDN	503236	4983595	OPCJ	Yes	Yes	No	1	L
686293	OAKDALE TH-1	1022	518	297	105	OPVL	CSTL	501432	4982997	OPCJ	Yes	Yes	No	3	L
686294	OAKDALE TH-2	1024	501	281	90	OPVL	CSTL	501816	4983783	OPCJ	Yes	Yes	No	6	L
737654	MW SP-44	999	135	125	90	OPVL	OSTP	501962	4981485	OSTP	Yes	Yes	No	1	L
737655	MW PC-45	999	295	285	90	OPVL	OPDC	501958	4981485	OPDC	Yes	Yes	No	1	L
756465	YOCUM, TIM	970	160	145	123	OSTP	OSTP	504014	4984905	OSTP	Yes	No	No	3	L
773389	OAKDALE 10	1023	501	415	90	OPVL	CSTL	501854	4983717	CJDN	Yes	Yes	No	1	L
777305	SETTERSTROM, STEVEN & LISA	1003	560	523	39	OPVL	CFRN	504908	4980564	CTCG	Yes	Yes	No	4	L

FIGURES

N

0 0.125 0.25 0.5 MILE

LEGEND

- CITY WELL
- 1 YEAR POROUS FLOW DELINEATION
- 10 YEAR POROUS FLOW DELINEATION
- GROUNDWATER CONTOURS

BASE MAPPING

- CITY LIMITS
- PARCEL

CITY OF OAKDALE

CITY OF NORTH SAINT PAUL

CITY OF MAPLEWOOD

CITY OF LAKE ELMO

890 FT
885 FT
880 FT
875 FT
870 FT
865 FT
860 FT
855 FT
850 FT
845 FT
840 FT
835 FT
830 FT
825 FT
820 FT

WELL 10
WELL 3
WELL 8
WELL 5
WELL 9
WELL 7
WELL 1
WELL 2

FIGURE 1 - JORDAN AQUIFER POROUS FLOW DELINEATION

OAKDALE WELLHEAD PROTECTION PLAN

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

JUNE 2015

V:\1938\active\193801820\GIS\Projects\Part 1 Figure 1 - Porous Flow.mxd

N

0 ¼ ½ MILE

CITY OF OAKDALE

CITY OF NORTH SAINT PAUL

W WELL 10

W WELL 3

CITY OF MAPLEWOOD

CITY OF OAKDALE

CITY OF LAKE ELMO

W WELL 8

W WELL 5

W WELL 9

W WELL 7

W WELL 1

W WELL 2

LEGEND

W CITY WELL

1 YEAR FRACTURE FLOW CAPTURE ZONE

5 YEAR CAPTURE ZONE WITH UPGRADIENT EXTENSION AND OVERLAP CALCULATION

BASE MAPPING

CITY LIMITS

PARCEL

FIGURE 2 - PRAIRIE DE CHIEN AQUIFER FRACTURE FLOW DELINEATION

OAKDALE WELLHEAD PROTECTION PLAN

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

MAY 2015

V:\1938\active\193801820\GIS\Projects\Part 1 Figure 2 - Fracture Flow.mxd

N

0 ¼ ½ MILE

LEGEND

- W — CITY WELL
- EMERGENCY RESPONSE AREA
- WELLHEAD PROTECTION AREA
- DRINKING WATER SUPPLY MANAGEMENT AREA (DWSMA)

BASE MAPPING

- CITY LIMITS
- PARCEL

CITY OF OAKDALE

CITY OF NORTH SAINT PAUL

W WELL 10

W WELL 3

CITY OF MAPLEWOOD

CITY OF OAKDALE

W WELL 8

CITY OF LAKE ELMO

W WELL 5

W WELL 9

W WELL 7

CITY OF LAKE ELMO

CITY OF OAKDALE

W WELL 1

W WELL 2

FIGURE 3 - WHPA AND DWSMA DELINEATION

OAKDALE WELLHEAD PROTECTION PLAN

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

MAY 2015

V:\1938\active\193801820\GIS\Projects\Part 1 Figure 3 - WHPA & DWSMA.mxd

N

0 ¼ ½ MILE

LEGEND

- CITY WELL
- WELL WITH UNIQUE NUMBER AND GEOLOGICAL SENSITIVITY
- DECORAH SHALE PRESENT
- GLENWOOD SHALE PRESENT
- BASAL ST. PETER PRESENT
- NO BEDROCK DATA AVAILABLE
- EMERGENCY RESPONSE AREA
- WELLHEAD PROTECTION AREA
- MODERATE VULNERABILITY DWSMA
- A A' CROSS SECTION LAYOUT

BASE MAPPING

- CITY LIMITS
- PARCEL

CITY OF OAKDALE
CITY OF NORTH SAINT PAUL
CITY OF MAPLEWOOD
CITY OF LAKE ELMO
CITY OF OAKDALE
CITY OF LAKE ELMO
CITY OF OAKDALE

WELL 10
WELL 3
WELL 8
WELL 5
WELL 9
WELL 7
WELL 1
WELL 2

242983 - L
597087 - L
256153 - L
182682 - L
182774 - L
756465 - L
546293 - M
231863 - L
407062 - L
112433 - L
435130 - M
526346 - L
122013 - L
182930 - L
208433 - L
686294 - L
200440 - M
190337 - L
773389 - L
190333 - L
142304 - L
686284 - L
235622 - L
208454 - L
440554 - M
686293 - L
255284 - L
235516 - L
594563 - L
652406 - L
134754 - L
196717 - M
196718 - M
154476 - L
471065 - L
257393 - M
271817 - L
257397 - L
575148 - L
588139 - L
247185 - L
256146 - M
255348 - L
572608 - M
190335 - M
247095 - M
200874 - L
235520 - M
737654 - L
737655 - L
244659 - M
270045 - L
569782 - L
616945 - L
235618 - L
190334 - L
235519 - M
569978 - L
255297 - M
257354 - M
590079 - M
599954 - M
575072 - L
777305 - L
575204 - L
256267 - L
225748 - L
256270 - L
257018 - L
512491 - L
233583 - M
478956 - L
199508 - M
233916 - M
233833 - L
248860 - L
248861 - L
208233 - L
233881 - L
174298 - L
244351 - L
243461 - L
243440 - L
112538 - L
208464 - L
270259 - L
208462 - L
208463 - L
243759 - L

A A' B B' C C'

Stantec
2335 Highway 36 West
Saint Paul, MN 55113
651.636.4600

FIGURE 4 - DWSMA VULNERABILITY

OAKDALE WELLHEAD PROTECTION PLAN

JUNE 2015

V:\1938\active\193801820\GIS\Projects\Part 1 Figure 4 - DWSMA.mxd

FIGURE 5 - GEOLOGIC CROSS-SECTION A-A', CITY OF OAKDALE

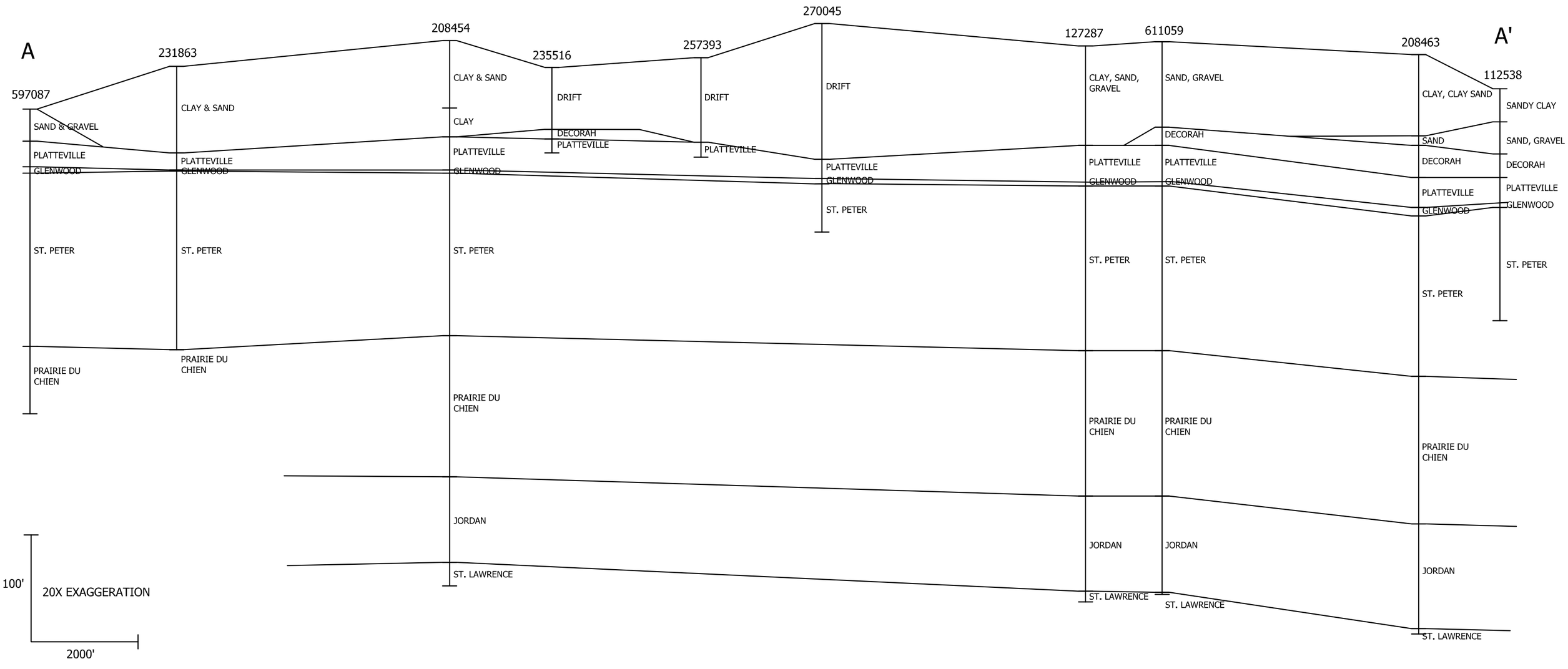


FIGURE 6 - GEOLOGIC CROSS-SECTION B-B', CITY OF OAKDALE

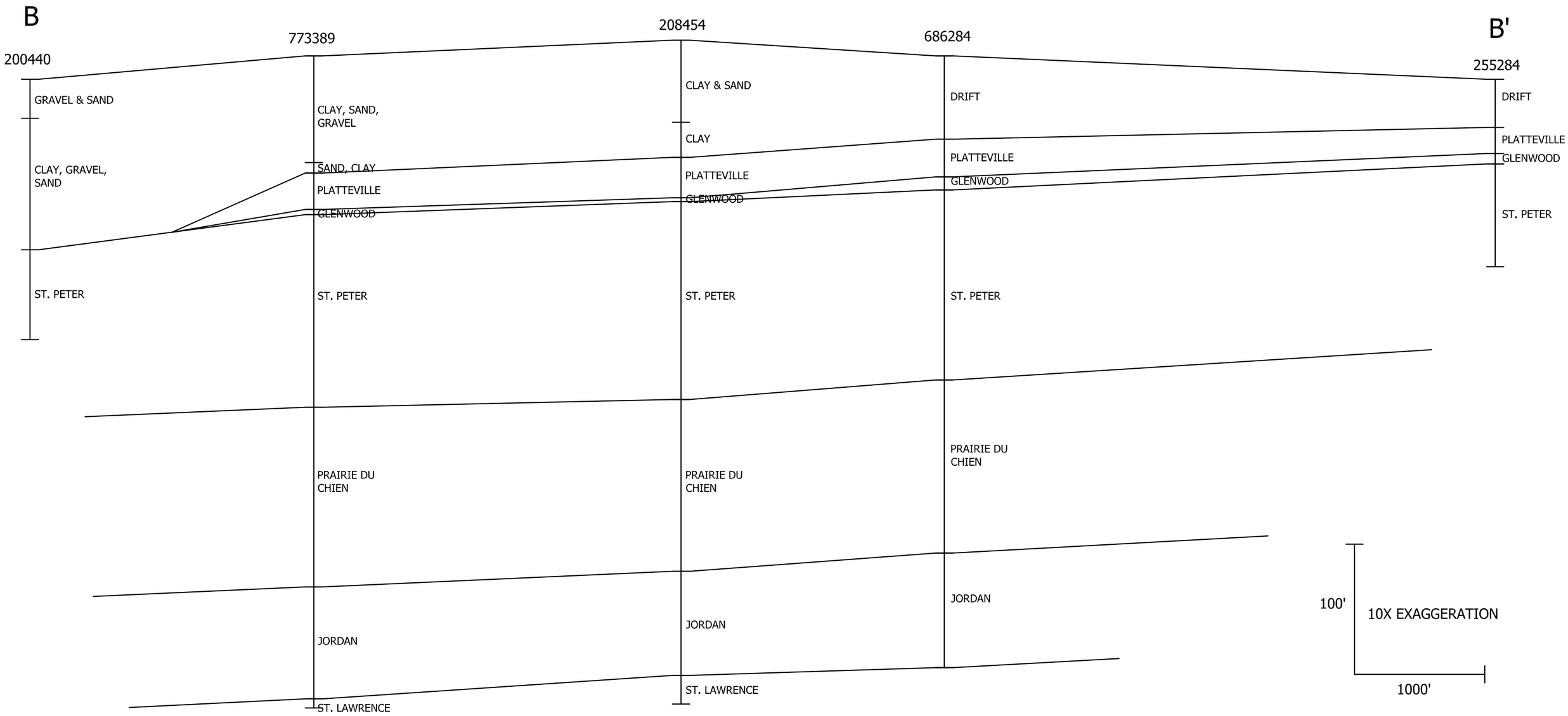
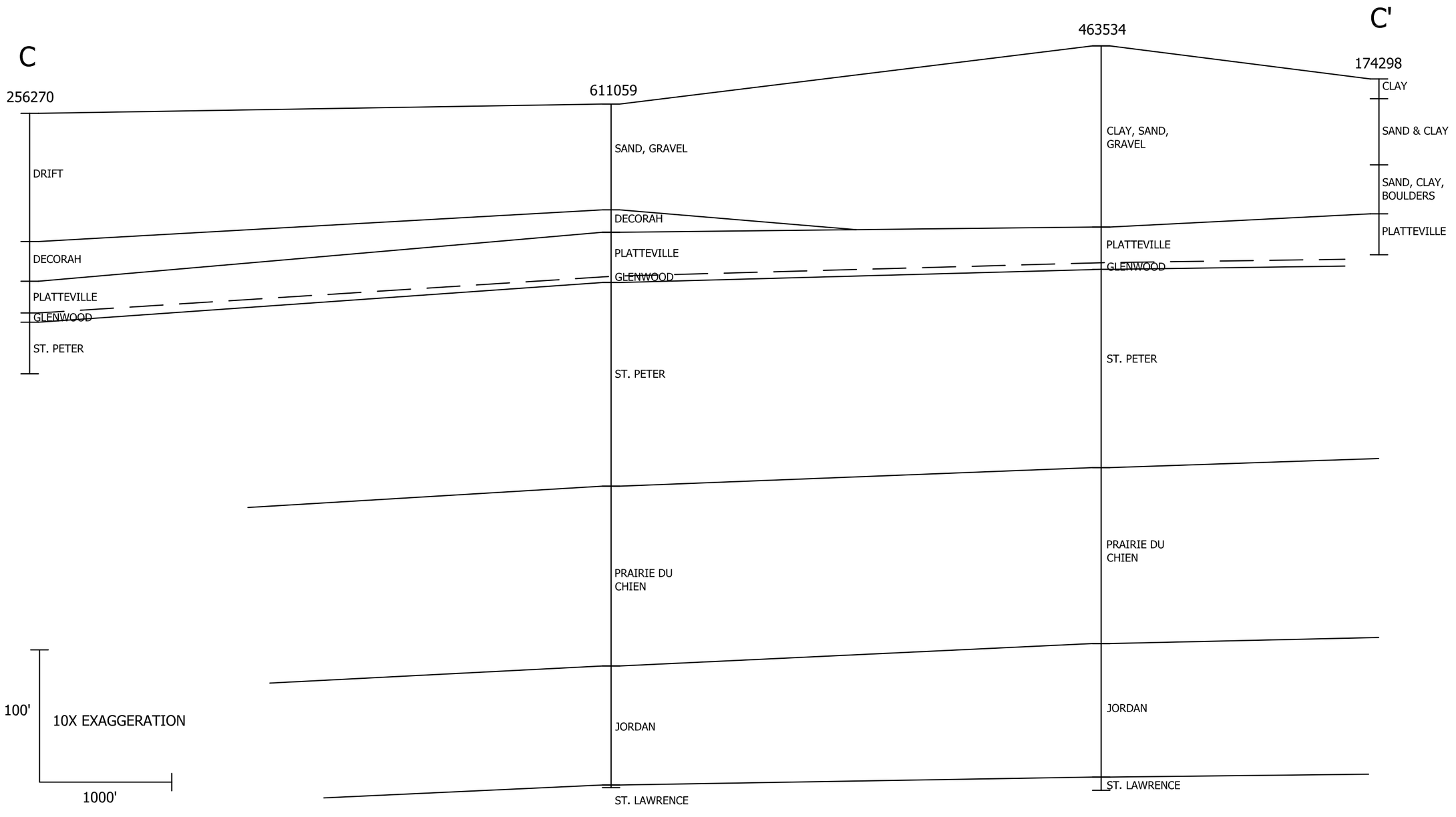


FIGURE 7 - GEOLOGIC CROSS-SECTION C-C', CITY OF OAKDALE



APPENDIX A

CITY OF OAKDALE WELL LOGS

Unique No. 00208462

County Name Washington

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2012/08/07

Entry Date 1989/07/11

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	31	AADBAA

Well Depth		Depth Completed		Date Well Completed
581	ft.	581	ft.	1958/10/00

Well Name OAKDALE 1

Drilling Method Cable Tool

Contact's Name OAKDALE WATER CO. - OAKDALE #1

OAKDALE MN

Drilling Fluid

Well Hydrofractured? ☐ Yes ☐ No

From ft. to ft.

Use Community Supply

Casing **Drive Shoe?** ☐ Yes ☐ N

Hole Diameter

0 in. t 580 ft

Casing Diameter **Weight(lbs/ft)**

20 in. t 120 ft

12 in. t 501 ft

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
CLAY			0	11
SAND			11	74
SANDY CLAY			74	79
SAND			79	89
CLAY			89	124
SAND			124	129
CLAY			129	159
PLATTEVILLE LIMEROCK			159	188
SHALE			188	193
ST. PETER SANDROCK			193	347
SHAKOPEE LIMEROCK			347	485
JORDAN SANDROCK			485	581

Screen N

Make Type

Open Hole From 500 ft. to 580 ft.

Static Water Level 239 ft. from Land surface Date 1958/10/00

PUMPING LEVEL (below land surface)

293 ft. after hrs. pumping 800 g.p.m.

Well Head Completion

Pitless adapter mfr Model

Casing Protection ☐ 12 in. above grade

☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	500	32	Y

Nearest Known Source of Contamination

ft. direction type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed Y

Mfr nam BYRON JACKSON

Model HP 100 Volts

Drop Pipe Length 310 ft. Capacity 800 g.p.m

Type T

Any not in use and not sealed well(s) on property? ☐ Yes ☐ No

Was a variance granted from the MDH for this Well? ☐ Yes ☐ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

BAILED OUT 250 YDS. OF SANDROCK, BUT COULD NOT LOWER IT.

LOCATED AT MINNEHAHA AV. AND OAKDALE DR.

WELL WAS BLASTED W (1) 50# BOMB FILLING HOLE TO 554'

USGS Quad Lake Elmo Elevation 1095

Aquifer: CJDN Alt Id: 78-6197

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012

License Business Name

Name of Driller BRANDON J

Report Copy

Unique No. 00208463
County Name Washington

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 1031

Update Date 2012/08/07
Entry Date 1989/07/11

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	31	BDAAAB

Well Depth 542 ft. **Depth Completed** 542 ft. **Date Well Completed** 1964/04/20

Well Name OAKDALE 2

Drilling Method Cable Tool

Contact's Name OAKDALE 2
6492 7TH ST
OAKDALE MN

Drilling Fluid

Well Hydrofractured? ☐ Yes ☐ No
From ft. to ft.

Use Community Supply

Casing **Drive Shoe?** ☐ Yes ☐ N

Hole Diameter
0 in. t 542 ft

Casing Diameter **Weight(lbs/ft)**
24 in. t 118 ft
16 in. t 458 ft

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
CLAY & PEAT	BLACK		0	27
CLAY SAND	GRAY		27	37
CLAY SAND	ORAN		37	62
CLAY	BLUE	HARD	62	76
SAND	GRAY	HARD	76	81
SANDY CLAY			81	85
CLAY	BLUE		85	115
ROCK	BLUE	HARD	115	143
SHALE	BLUE		143	151
SANDROCK & BLUE SHALE			151	165
SANDROCK	GRAY		165	301
LIMEROCK	RED		301	439
SANDROCK	WHITE		439	485
SHALE & SANDROCK	YELLO	HARD	485	495
SANDROCK	YELLO	SOFT	495	522
SHALEY SANDROCK	GRAY		522	537
SHALE	GRAY		537	542

Screen N
Make Type

Open Hole From 458 ft. to 542 ft.

Static Water Level 197 ft. from Land surface Date 1964/04/20

PUMPING LEVEL (below land surface)
234 ft. after hrs. pumping 1000 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ☐ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☐ Yes ☐ No

Nearest Known Source of Contamination
ft. direction type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed Y
Mfr nam
Model HP 0 Volts
Drop Pipe Length ft. Capacity 800 g.p.m
Type

Any not in use and not sealed well(s) on property? ☐ Yes ☐ No

Was a variance granted from the MDH for this Well? ☐ Yes ☐ No

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 27022
License Business Name
Name of Driller

REMARKS, ELEVATION, SOURCE OF DATA, etc.

M.G.S. NO. 299.

USGS Quad Lake Elmo Elevation 1022
Aquifer: CJDN Alt Id: 78-6197

Report Copy

Unique No. 00208454

County Name Washington

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2012/08/06

Entry Date 1989/07/11

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	18	AADBBD

Well Depth		Depth Completed		Date Well Completed
510	ft.	510	ft.	1969/06/24

Well Name OAKDALE 3

Drilling Method Cable Tool

Contact's Name OAKDALE 3
3888 HADLEY N AV
OAKDALE MN

Drilling Fluid

Well Hydrofractured? ☐ Yes ☐ No
From ft. to ft.

Use Community Supply

Casing **Drive Shoe?** ☐ Yes ☐ N

Hole Diameter
0 in. t 510 ft

Casing Diameter **Weight(lbs/ft)**
24 in. t 90 ft
20 in. t 424 ft

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SANDY CLAY			0	63
CLAY	BLUE		63	87
SHALE			87	90
PLATTEVILLE			90	121
SHALE			121	124
ST. PETER SANDROCK			124	276
SHAKOPEE			276	408
JORDAN SANDROCK			408	488
SHALE			488	510

Screen N

Open Hole From 424 ft. to 510 ft.

Make Type

Static Water Level 153 ft. from Land surface Date 1969/06/24

PUMPING LEVEL (below land surface)
323 ft. after hrs. pumping 1200 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ☐ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	424	41	Y

Nearest Known Source of Contamination
ft. direction type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed N
Mfr nam
Model HP 0 Volts
Drop Pipe Length ft. Capacity g.p.m
Type

Any not in use and not sealed well(s) on property? ☐ Yes ☐ No

Was a variance granted from the MDH for this Well? ☐ Yes ☐ No

USGS Quad White Bear Lake East Elevation 1035
Aquifer: CJSL Alt Id: 78-6197

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012
License Business Name
Name of Driller O'BRIEN, F.

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00127287

County Name Washington

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Minnesota Statutes Chapter 1031

Update Date 2012/08/07

Entry Date 1989/07/11

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	29	BCBBBD

Well Depth		Depth Completed		Date Well Completed
520	ft.	520	ft.	1978/07/00

Well Name OAKDALE 5

Drilling Method Cable Tool

Contact's Name OAKDALE 5

OAKDALE MN

Drilling Fluid

Well Hydrofractured? ☐ Yes ☐ No

From ft. to ft.

Use Community Supply

Casing **Drive Shoe?** ☑ Yes ☐ N

Hole Diameter

Casing Diameter				Weight(lbs/ft)
24	in. t	98	ft	94.62
20	in. t	436	ft	78.6

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
CLAY, SAND AND GRAVEL	BROW		0	90
HARDPAN	BROW		90	93
PLATTEVILLE	GRAY		93	131
SANDROCK	GRAY		131	285
LIMEROCK	WHT/B		285	421
SANDROCK	BROW		421	510
SHALE			510	520

Screen N

Open Hole From 436 ft. to 520 ft.

Make Type

Static Water Level 168 ft. from Land surface Date 19/78/07

PUMPING LEVEL (below land surface)

261 ft. after 6 hrs. pumping 2045 g.p.m.

Well Head Completion

Pitless adapter mfr Model

Casing Protection ☑ 12 in. above grade

☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	436	18.5	Y

Nearest Known Source of Contamination

ft. direction type

Well disinfected upon completion? ☑ Yes ☐ No

Pump ☑ Not Installed Date Installed N

Mfr nam

Model HP 0 Volts

Drop Pipe Length ft. Capacity g.p.m

Type

Any not in use and not sealed well(s) on property? ☐ Yes ☐ No

Was a variance granted from the MDH for this Well? ☐ Yes ☐ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

M.G.S. NO. 1420.

USGS Quad Lake Elmo Elevation 1030

Aquifer: CJDN Alt Id: 78-6197

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012

License Business Name

Name of Driller

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00463534

County Name Washington

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 1031

Update Date 2012/08/07

Entry Date 1994/01/11

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	29	CADDCA

Well Depth		Depth Completed		Date Well Completed
563	ft.	563	ft.	1990/12/14

Well Name OAKDALE 7

Drilling Method Cable Tool

Contact's Name OAKDALE 7
1265 HELMO AV
OAKDALE MN

Drilling Fluid

Well Hydrofractured? ☐ Yes ☐ No
From ft. to ft.

Use Community Supply

Casing **Drive Shoe?** ☑ Yes ☐ N

Casing Diameter				Weight(lbs/ft)
30	in. t	138	ft	118.6
18	in. t	467	ft	70.6

Hole Diameter

0	in. t	139	ft
0	in. t	563	ft

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
CLAY, SAND & GRAVEL	BROW	SOFT	0	137
PLATTEVILLE	GRAY	HARD	137	169
ST. PETER	TAN	MEDIUM	169	319
SHAKOPEE	BROW	HARD	319	452
JORDAN	GRAY	MEDIUM	452	553
SHALE	GRAY	MEDIUM	553	563

Screen N

Open Hole From 467 ft. to 563 ft.

Make Type

Static Water Level 210 ft. from Land surface Date 1990/11/30

PUMPING LEVEL (below land surface)
264.3 ft. after 8 hrs. pumping 1250 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ☑ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	467	56	Y

Nearest Known Source of Contamination
ft. direction type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☑ Not Installed Date Installed N
Mfr nam
Model HP 0 Volts
Drop Pipe Length ft. Capacity g.p.m
Type

Any not in use and not sealed well(s) on property? ☐ Yes ☑ No

Was a variance granted from the MDH for this Well? ☐ Yes ☐ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

M.G.S. NO. 3361.

USGS Quad Lake Elmo Elevation 1078
Aquifer: CJDN Alt Id: 78-6197

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 62012
License Business Name
Name of Driller UNERTL, F.

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00572608

County Name Washington

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 1031

Update Date 2012/02/06

Entry Date 1997/01/09

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	20	ABADCC

Well Depth		Depth Completed		Date Well Completed
463	ft.	463	ft.	1996/06/10

Well Name OAKDALE 8

Drilling Method Cable Tool

Well Owner's Name OAKDALE 8
HILO AV
OAKDALE MN 55128

Drilling Fluid
Water

Well Hydrofractured? ☐ Yes ☐ No
From ft. to ft.

Contact's Name CITY OF OAKDALE
1584 HADLEY N AV
OAKDALE MN 55128

Use Community Supply

Casing **Drive Shoe?** ☑ Yes ☐ N

Hole Diameter
0 in. t 381 ft
0 in. t 463 ft

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
DRIFT	BROW	SOFT	0	58
PLATTEVILLE STICKY	GRAY		58	81
ST. PETER	TAN	SOFT	81	235
LIMEROCK	TAN	HARD	235	370
SANDSTONE	TAN	HARD	370	463

Casing Diameter				Weight(lbs/ft)
30	in. t	59	ft	118.6
24	in. t	70	ft	94.62
18	in. t	381	ft	70.59

Screen N
Make Type

Open Hole From 381 ft. to 463 ft.

Static Water Level 112 ft. from Land surface Date 1996/04/02

PUMPING LEVEL (below land surface)
245 ft. after 24 hrs. pumping 1000 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ☑ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	70	105	S
G	0	381	1091	S

Nearest Known Source of Contamination
60 ft. direction E type SDF
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☐ Not Installed Date Installed Y
Mfr nam GOULDS
Model 12CHC HP 200 Volts 460
Drop Pipe Length 290 ft. Capacity E+03 g.p.m
Type T

Any not in use and not sealed well(s) on property? ☐ Yes ☑ No

Was a variance granted from the MDH for this Well? ☐ Yes ☑ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

M.G.S. NO. 3691.

USGS Quad Lake Elmo Elevation 1010
Aquifer: CJDN Alt Id: 78-6197

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 27058
License Business Name
Name of Driller MANTHIE, D.

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00611059
County Name Washington

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 1031

Update Date 2012/08/07
Entry Date 2001/03/27

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	30	ADCDBB

Well Depth		Depth Completed		Date Well Completed
517	ft.	517	ft.	2001/01/26

Well Name OAKDALE 9

Drilling Method Cable Tool

Well Owner's Name OAKDALE
68XX 15TH N ST
OAKDALE MN 55128

Drilling Fluid
Bentonite

Well Hydrofractured? ☐ Yes ☑ No
From ft. to ft.

Contact's Name CITY OF OAKDALE
1584 HADLEY N AV
OAKDALE MN 55128

Use Community Supply

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SAND & ROCKS	BROW	HARD	0	80
DECORAH SHALE	BLUE	HARD	80	97
PLATEVILLE	GRAY	HARD	97	135
ST. PETER SANDSTONE	GRAY	V.HARD	135	170
ST. PETER SANDSTONE	TAN	HARD	170	289
SHAKOPEE DOLOMITE	GRAY	V.HARD	289	425
JORDAN SANDSTONE	WHITE	MEDIUM	425	515
ST. LAWRENCE	BLUE	MEDIUM	515	517

Casing **Drive Shoe?** ☑ Yes ☐ N

Casing Diameter				Weight(lbs/ft)
30	in. t	104	ft	118.65
24	in. t	292	ft	94.62
18	in. t	441	ft	70.59

Hole Diameter

in. t	288	ft	
in. t	441	ft	
in. t	517	ft	

Screen N
Make Type

Open Hole From 441 ft. to 517 ft.

Static Water Level 173 ft. from Land surface Date 2001/01/31

PUMPING LEVEL (below land surface)
235 ft. after 8 hrs. pumping 1560 g.p.m.

Well Head Completion
Pitless adapter mfr Model
Casing Protection ☑ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G	0	292	21	Y
G	0	441	48	Y

Nearest Known Source of Contamination
200 ft. direction S type SEW
Well disinfected upon completion? ☑ Yes ☐ No

Pump ☑ Not Installed Date Installed N
Mfr nam
Model HP Volts
Drop Pipe Length ft. Capacity g.p.m
Type

Any not in use and not sealed well(s) on property? ☐ Yes ☑ No

Was a variance granted from the MDH for this Well? ☐ Yes ☑ No

USGS Quad Lake Elmo Elevation 1034
Aquifer: CJDN Alt Id: 78-6197

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 71015
License Business Name
Name of Driller SIGAFOOS, R.

Report Copy

HE-01205-06 (Rev. 9/96)

Unique No. 00773389
County Name Washington

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
Minnesota Statutes Chapter 1031

Update Date 2012/08/03
Entry Date 2010/04/06

Township Name	Township	Range	Dir	Section	Subsection
	29	21	W	7	CDDCCD

Well Depth 501 ft. **Depth Completed** 501 ft. **Date Well Completed** 2010/00/00

Well Name OAKDALE 10

Drilling Method Cable Tool

Contact's Name CITY OF OAKDALE
1584 HADLEY N AV
OAKDALE MN 55128

Drilling Fluid Additive (+ Bentonite)

Well Hydrofractured? ☐ Yes ☑ No
From ft. to ft.

Well Owner's Name OAKDALE 10
4033 GOODWIN N AV
OAKDALE MN 55128

Use Community Supply

Casing **Drive Shoe?** ☑ Yes ☐ N

Casing Diameter				Weight(lbs/ft)
30	in. t	104	ft	118.65
24	in. t	288	ft	94.62
18	in. t	415	ft	70.59

Hole Diameter

in. t	284	ft	
in. t	410	ft	
in. t	501	ft	

GEOLOGICAL MATERIAL	COLOR	HARDNESS	FROM	TO
SAND, GRAVEL, CLAY	BROW	SFT-MED	0	51
CLAY, SAND, ROCKS	GRAY	SFT-MED	51	82
SAND BROKEN LIME	BROW	HARD	82	87
SHALE & PLATTEVILLE	LT. BR	HARD	87	90
PLATTEVILLE	TAN	HARD	90	115
PLATTEVILLE/SHALE	GRAY	HARD	115	118
PLATTEVILLE/SHALE	GRAY	HARD	118	119
ST. PETER	BROW	MED-HRD	119	122
ST. PETER	BROW	MED-HRD	122	270
ST. PETER	BROW	MED-HRD	270	280
SHAKOPEE	TAN	V.HARD	280	408
JORDAN	BROW	MEDIUM	408	494
ST. LAWRENCE	GRN/G		494	501

Screen N
Make Type

Open Hole From 415 ft. to 501 ft.

Static Water Level 145 ft. from Land surface Date 2010/06/01

PUMPING LEVEL (below land surface)
261.4 ft. after 24 hrs. pumping 1000 g.p.m.

Well Head Completion
Pitless adapter mfr PUMPHOUSE Model
Casing Protection ☑ 12 in. above grade
☐ At-grade(Environmental Wells and Borings ONLY)

Grouting Information Well grouted? ☑ Yes ☐ No

Material	From	To (ft.)	Amount(yds/bags)	
G		284	24	Y
G		415	67.5	Y

Nearest Known Source of Contamination
200 ft. direction S type SEW
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Mfr nam GOULD
Model 12CMC-7 HP 200 Volts 460
Drop Pipe Length 280 ft. Capacity E+03 g.p.m
Type T

Any not in use and not sealed well(s) on property? ☐ Yes ☑ No

Was a variance granted from the MDH for this Well? ☐ Yes ☑ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

GAMMA LOGGED 6-15-2010. M.G.S. NO. 4988. LOGGED BY JIM TRAEN.

USGS Quad White Bear Lake East Elevation 1023
Aquifer: CJDN Alt Id: 4988

Well CONTRACTOR CERTIFICATION Lic. Or Reg. No. 1431
License Business Name
Name of Driller MOOS, P.

Report Copy

APPENDIX B

MODEL CALIBRATION RESULTS

Oakdale - Wellhead Protection Model Run 8 - Small Scale Calibration Results

Well Name	UTM E	UTM N	Row	Column	Layer	Group	Zone	Observed	Computed	Residual
244346	498447	4982783	248	207	1	1	1	285.1	263.3	21.8
244347	498448	4982784	248	207	1	1	1	291.3	263.3	28.0
623058	498450	4982785	248	207	1	1	1	290.5	263.3	27.2
145744	505879	4983949	211	340	1	1	1	275.2	269.2	6.0
435328	504517	4986405	165	329	1	1	1	278.0	273.8	4.2
406170	501278	4975654	408	244	2	1	2	242.3	242.9	-0.6
122022	502028	4975938	403	268	2	1	2	247.5	244.9	2.6
200001	501054	4976490	394	239	2	1	2	257.5	246.4	11.1
242872	500804	4976619	392	235	2	1	2	253.0	246.7	6.3
437759	505963	4977362	380	341	2	1	2	268.5	252.8	15.7
176001	505814	4977363	380	340	2	1	2	267.6	252.6	15.0
436584	506456	4977375	380	345	2	1	2	267.3	253.8	13.5
200521	497733	4977510	378	201	2	1	2	245.4	241.3	4.1
112538	501606	4978152	362	254	2	1	2	259.1	252.6	6.5
208233	500680	4978676	345	233	2	1	2	254.5	253.6	0.9
208234	500688	4978676	345	233	2	1	2	254.5	253.6	0.9
244666	501043	4978696	345	239	2	1	2	259.4	253.8	5.6
201094	499899	4978874	339	220	2	1	2	253.0	253.6	-0.6
201093	499946	4979634	315	221	2	1	2	257.5	256.1	1.4
194159	505692	4981557	267	339	2	1	2	271.3	264.3	7.0
176036	505751	4981561	267	339	2	1	2	271.3	264.2	7.1
173927	505913	4981580	267	341	2	1	2	265.2	264.1	1.1
176046	505668	4981585	267	339	2	1	2	277.7	264.4	13.3
415659	505629	4981623	266	338	2	1	2	266.7	264.5	2.2
121056	505895	4981640	266	340	2	1	2	270.6	264.3	6.3
440577	505042	4981643	266	334	2	1	2	267.9	264.4	3.5
176020	505688	4981648	266	339	2	1	2	278.3	264.5	13.8
173938	505780	4981684	265	340	2	1	2	272.5	264.6	7.9
442140	505019	4981717	265	333	2	1	2	271.9	264.6	7.3
176049	505669	4981721	265	339	2	1	2	273.4	264.7	8.7
440589	504950	4981731	265	333	2	1	2	269.4	264.6	4.8
428479	505151	4981768	264	335	2	1	2	276.1	264.8	11.3
185945	505733	4981797	263	339	2	1	2	270.3	264.9	5.4
173925	505703	4981814	263	339	2	1	2	270.6	264.9	5.7
415655	508445	4981852	263	354	2	1	2	273.1	261.9	11.2
121060	505230	4981907	262	335	2	1	2	271.3	265.2	6.1
156421	505232	4981928	261	335	2	1	2	270.0	265.3	4.7
428478	505092	4982002	260	334	2	1	2	277.0	265.5	11.5
413551	506116	4982216	257	342	2	1	2	269.4	265.3	4.1
415653	505448	4982565	251	337	2	1	2	266.7	267.0	-0.3
153462	508111	4982723	249	353	2	1	2	266.7	263.4	3.3
200450	497178	4982724	249	197	2	1	2	253.6	261.3	-7.7
182916	508197	4982949	243	353	2	1	2	273.4	263.5	9.9
200447	496957	4983147	236	195	2	1	2	248.4	262.0	-13.6
112455	505928	4983162	236	341	2	1	2	268.2	267.5	0.7
142375	505743	4983163	236	339	2	1	2	269.7	267.9	1.8
109696	505647	4983229	234	338	2	1	2	263.3	268.2	-4.9
134793	505664	4983276	232	339	2	1	2	269.1	268.2	0.9
133470	504630	4983362	229	330	2	1	2	271.9	269.3	2.6
208453	504769	4983363	229	331	2	1	2	271.9	269.4	2.5
208451	504722	4983537	224	331	2	1	2	274.9	269.8	5.1
208452	504483	4983607	222	329	2	1	2	271.3	269.8	1.5

Oakdale - Wellhead Protection Model Run 8 - Small Scale Calibration Results

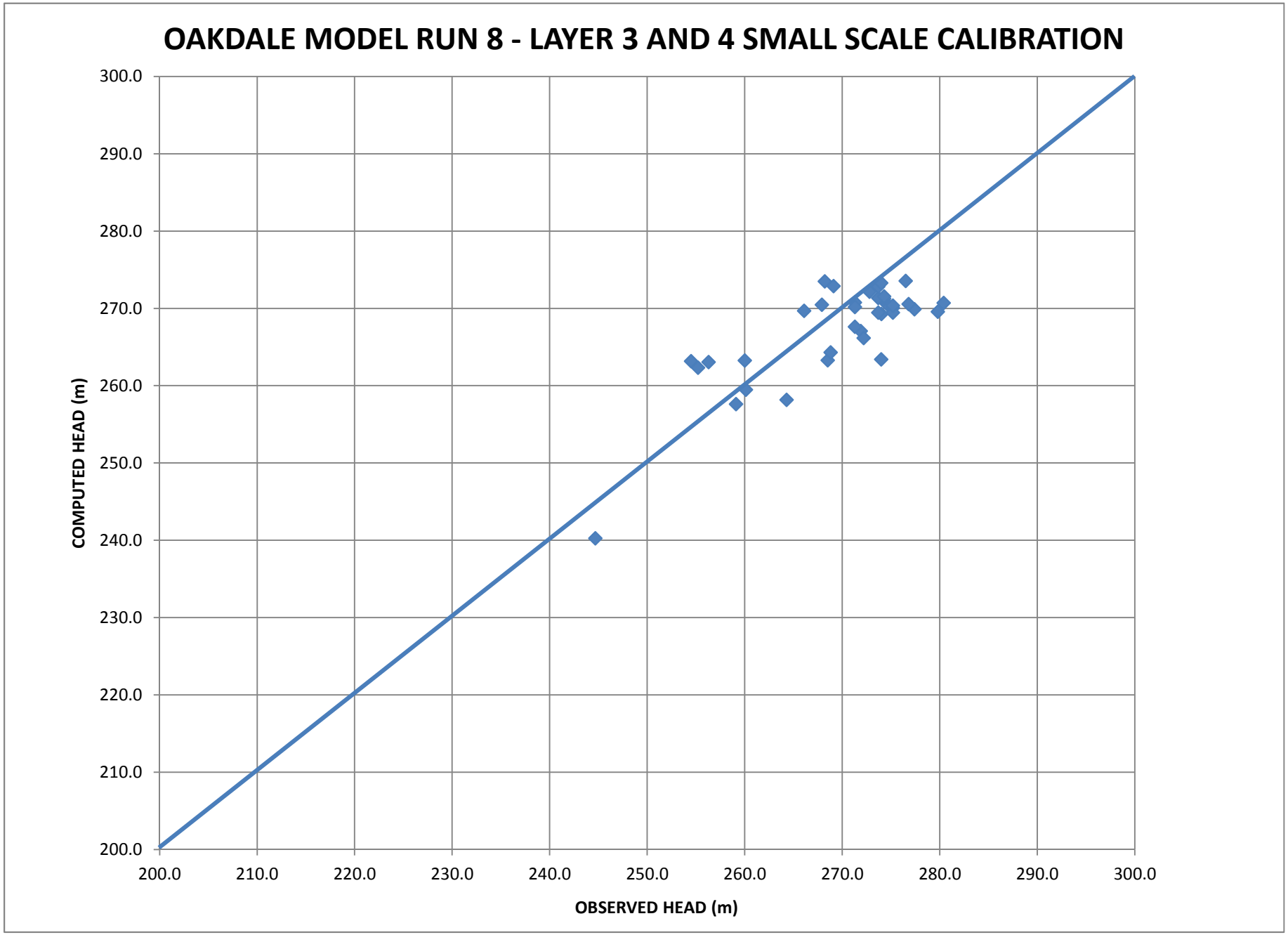
Well Name	UTM E	UTM N	Row	Column	Layer	Group	Zone	Observed	Computed	Residual
142396	505076	4983640	220	334	2	1	2	274.9	269.9	5.0
106302	505201	4983641	220	335	2	1	2	281.9	269.8	12.1
200440	501191	4983690	219	241	2	1	2	269.7	266.4	3.3
208217	496948	4983702	218	195	2	1	2	257.5	263.0	-5.5
418779	505044	4983721	218	334	2	1	2	274.3	270.1	4.2
112348	504715	4983729	218	331	2	1	2	273.1	270.2	2.9
142323	505512	4983752	217	337	2	1	2	266.7	269.4	-2.7
136125	505536	4983787	216	338	2	1	2	280.4	269.5	10.9
136783	505340	4983789	216	336	2	1	2	280.4	269.8	10.6
136784	505286	4983790	216	336	2	1	2	278.0	269.9	8.1
175190	505464	4983804	215	337	2	1	2	274.3	269.6	4.7
163724	505663	4983825	215	339	2	1	2	274.9	269.3	5.6
136788	505348	4983849	214	336	2	1	2	274.6	269.9	4.7
135340	504883	4983874	213	332	2	1	2	276.7	270.4	6.3
162296	507182	4983899	212	349	2	1	2	279.5	267.0	12.5
171098	505759	4983921	211	339	2	1	2	274.9	269.3	5.6
208441	504753	4983928	211	331	2	1	2	271.0	270.5	0.5
136790	505263	4983930	211	335	2	1	2	274.3	270.2	4.1
136773	505374	4983974	210	336	2	1	2	266.7	270.2	-3.5
162277	505492	4983977	210	337	2	1	2	281.0	270.0	11.0
156367	505610	4983982	210	338	2	1	2	269.1	269.9	-0.8
175188	505698	4984003	209	339	2	1	2	274.3	269.7	4.6
162292	505659	4984020	208	339	2	1	2	263.6	269.8	-6.2
185754	505578	4984082	206	338	2	1	2	269.1	270.0	-0.9
182930	504221	4984163	204	326	2	1	2	277.7	270.7	7.0
122013	504033	4984166	204	323	2	1	2	269.7	270.6	-0.9
156365	504682	4984258	201	331	2	1	2	275.8	271.0	4.8
208439	505140	4984288	200	334	2	1	2	265.2	270.7	-5.5
427628	504289	4984323	199	327	2	1	2	270.6	271.1	-0.5
423254	504206	4984373	197	325	2	1	2	280.4	271.1	9.3
421213	504336	4984418	197	327	2	1	2	268.8	271.2	-2.4
208438	505167	4984424	196	335	2	1	2	263.6	270.8	-7.2
429681	504143	4984430	196	324	2	1	2	271.9	271.1	0.8
208436	505265	4984641	193	335	2	1	2	271.6	271.1	0.5
136136	504095	4984738	191	324	2	1	2	271.3	271.7	-0.4
208446	508223	4984739	191	353	2	1	2	264.9	265.3	-0.4
436632	497279	4984754	191	198	2	1	2	257.5	265.1	-7.6
145788	498505	4984766	191	207	2	1	2	270.0	266.0	4.0
145787	498466	4984767	191	207	2	1	2	270.0	265.9	4.1
110404	507967	4984782	191	352	2	1	2	272.5	266.2	6.3
407062	504056	4984786	191	323	2	1	2	270.3	271.7	-1.4
208214	497922	4984899	189	203	2	1	2	263.9	265.7	-1.8
177078	504692	4984908	189	331	2	1	2	268.2	271.9	-3.7
208213	497927	4984987	187	203	2	1	2	264.9	265.9	-1.0
440010	506095	4985241	183	342	2	1	2	272.2	270.9	1.3
170691	504534	4985279	183	330	2	1	2	281.3	272.4	8.9
107439	503964	4985337	182	322	2	1	2	281.3	272.7	8.6
112475	503990	4985342	182	322	2	1	2	278.3	272.8	5.5
163747	503631	4985343	182	316	2	1	2	275.8	272.5	3.3
182774	503786	4985361	181	319	2	1	2	271.9	272.7	-0.8
195704	503895	4985391	181	320	2	1	2	280.4	272.9	7.5
135355	503876	4985448	180	320	2	1	2	267.9	273.0	-5.1

Oakdale - Wellhead Protection Model Run 8 - Small Scale Calibration Results

Well Name	UTM E	UTM N	Row	Column	Layer	Group	Zone	Observed	Computed	Residual
135354	503824	4985465	180	319	2	1	2	270.6	273.0	-2.4
410160	506063	4985491	179	342	2	1	2	274.6	271.3	3.3
178262	503802	4985511	179	319	2	1	2	272.2	273.1	-0.9
106318	504343	4985522	179	328	2	1	2	278.9	273.0	5.9
153455	504400	4985533	179	328	2	1	2	272.8	273.0	-0.2
135375	503867	4985535	179	320	2	1	2	268.2	273.1	-4.9
423107	506148	4985536	179	342	2	1	2	275.5	271.3	4.2
428486	505954	4985553	178	341	2	1	2	277.4	271.5	5.9
176017	506056	4985558	178	342	2	1	2	274.3	271.4	2.9
175183	506198	4985563	178	343	2	1	2	272.2	271.3	0.9
421226	506718	4985580	178	347	2	1	2	272.2	270.6	1.6
155076	503780	4985594	178	319	2	1	2	272.2	273.2	-1.0
406180	505922	4985597	178	341	2	1	2	273.4	271.6	1.8
179088	506504	4985600	178	345	2	1	2	273.7	271.0	2.7
163804	503766	4985628	177	318	2	1	2	265.2	273.2	-8.0
182667	506186	4985661	177	343	2	1	2	272.8	271.5	1.3
154474	503771	4985753	175	318	2	1	2	279.5	273.3	6.2
421713	503917	4985753	175	321	2	1	2	274.0	273.3	0.7
195737	503771	4985775	175	318	2	1	2	268.2	273.3	-5.1
244590	501899	4985810	174	263	2	1	2	275.6	272.7	2.9
138982	505979	4985831	174	341	2	1	2	280.4	272.0	8.4
175184	506640	4985846	174	346	2	1	2	268.2	271.2	-3.0
182660	506480	4985859	173	345	2	1	2	272.5	271.4	1.1
420634	506022	4985905	173	341	2	1	2	279.8	272.1	7.7
401221	506086	4985921	172	342	2	1	2	275.5	272.0	3.5
182705	506551	4985973	172	346	2	1	2	275.2	271.5	3.7
182786	503760	4985996	171	318	2	1	2	274.9	273.5	1.4
154426	503628	4986027	171	316	2	1	2	277.4	273.5	3.9
410177	506458	4986029	171	345	2	1	2	278.3	271.8	6.5
184039	504590	4986416	165	330	2	1	2	276.4	273.7	2.7
182751	504782	4986441	164	332	2	1	2	272.8	273.7	-0.9
122016	507546	4978947	337	351	3	1	3	264.3	258.2	6.1
413577	506664	4978966	336	347	3	1	3	259.1	257.6	1.5
182731	505774	4981634	266	339	3	1	3	256.3	263.0	-6.7
208457	506119	4981679	265	342	3	1	3	268.5	263.3	5.2
437308	505177	4981836	263	335	3	1	3	254.5	263.2	-8.7
440560	505174	4981872	262	335	3	1	3	260.0	263.3	-3.3
208455	506058	4982072	259	342	3	1	3	268.8	264.3	4.5
151756	507985	4982648	250	352	3	1	3	274.0	263.4	10.6
200443	498444	4982800	247	207	3	1	3	255.2	262.3	-7.1
110428	505982	4983168	236	341	3	1	3	271.9	267.1	4.8
419817	505260	4983970	210	335	3	1	3	277.4	269.9	7.5
428490	505850	4984142	204	340	3	1	3	279.8	269.6	10.2
208435	504369	4984155	204	328	3	1	3	266.1	269.7	-3.6
551577	506308	4984368	197	344	3	1	3	274.0	269.3	4.7
110581	505454	4984683	192	337	3	1	3	271.3	270.8	0.5
423827	505127	4984688	192	334	3	1	3	274.3	270.9	3.4
131969	506126	4985061	186	342	3	1	3	274.6	270.5	4.1
423338	506100	4985111	185	342	3	1	3	280.4	270.7	9.7
141734	505707	4985136	185	339	3	1	3	274.3	271.3	3.0
411606	506536	4985173	184	346	3	1	3	271.3	270.2	1.1
110524	507564	4985185	184	351	3	1	3	271.3	267.6	3.7

Oakdale - Wellhead Protection Model Run 8 - Small Scale Calibration Results

Well Name	UTM E	UTM N	Row	Column	Layer	Group	Zone	Observed	Computed	Residual
423259	506618	4985196	184	346	3	1	3	275.2	270.1	5.1
418746	506465	4985254	183	345	3	1	3	267.9	270.5	-2.6
170653	505973	4985372	181	341	3	1	3	273.7	271.3	2.4
182781	506542	4985381	181	346	3	1	3	276.8	270.6	6.2
420640	503725	4985737	175	318	3	1	3	269.1	272.9	-3.8
186982	507466	4985823	174	350	3	1	3	275.2	269.4	5.8
163433	507473	4985824	174	350	3	1	3	273.7	269.4	4.3
163781	508457	4985834	174	354	3	1	3	272.2	266.2	6.0
176027	506490	4985897	173	345	3	1	3	274.3	271.5	2.8
138364	507177	4985928	172	349	3	1	3	275.2	270.4	4.8
421245	506103	4985977	172	342	3	1	3	272.8	272.2	0.6
410176	504796	4986004	171	332	3	1	3	273.7	272.8	0.9
404148	503941	4986011	171	321	3	1	3	274.0	273.3	0.7
154410	504089	4986187	168	324	3	1	3	268.2	273.5	-5.3
420628	504448	4986366	165	329	3	1	3	276.5	273.6	2.9
200054	501030	4975379	412	239	4	1	2	244.7	240.3	4.4
200874	501102	4981659	266	240	4	1	2	260.1	259.5	0.6
188777	506328	4983538	224	344	6	1	1	257.3	259.5	-2.2


OAKDALE MODEL RUN 8 - LAYER 3 AND 4 SMALL SCALE CALIBRATION
COMPUTED HEAD (m)
OBSERVED HEAD (m)
300.0
290.0
280.0
270.0
260.0
250.0
240.0
230.0
220.0
210.0
200.0
200.0
210.0
220.0
230.0
240.0
250.0
260.0
270.0
280.0
290.0
300.0

APPENDIX C

WELL VULNERABILITY ASSESSMENT WORKSHEETS

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820016 TIER: 1
SYSTEM NAME: Oakdale WHP RANK:
WELL NAME: Well #1 UNIQUE WELL #: 00208462

COUNTY: Washington TOWNSHIP NUMBER: 29 RANGE: 21 W SECTION: 31 QUARTERS: AAAC

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	10
L Score	:	8	
Geologic Data From	:	Well Record	
Year Constructed	:	1958	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	501	0
Well Depth	:	581	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	800	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	1.3 04/09/2014	10
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		30
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS
THIS WELL IS CONSIDERED VULNERABLE BASED ON TRITIUM DATA FROM CITY WELLS 3 AND 7.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820016 TIER: 1
SYSTEM NAME: Oakdale WHP RANK:
WELL NAME: Well #10 UNIQUE WELL #: 00773389

COUNTY: Washington TOWNSHIP NUMBER: RANGE: SECTION: QUARTERS:

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	2010	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	415	0
Well Depth	:	501	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		No	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	.31 08/21/2013	0
Maximum tritium detected	:	5.1 07/10/2012	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		30
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		

COMMENTS
Low geologic sensitivity based on the presence of four feet of Glenwood Shale.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820016 TIER: 1
SYSTEM NAME: Oakdale WHP RANK:
WELL NAME: Well #2 UNIQUE WELL #: 00208463

COUNTY: Washington TOWNSHIP NUMBER: 29 RANGE: 21 W SECTION: 31 QUARTERS: BDAA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	10
L Score	:	8	
Geologic Data From	:	Well Record	
Year Constructed	:	1964	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	458	0
Well Depth	:	542	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Unknown	5
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	.88 04/24/2007	0
Maximum tritium detected	:	2 08/21/2001	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		25
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS
VULNERABLE BASED ON TRITIUM DATA FROM OTHER CITY WELL.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820016 TIER: 1
SYSTEM NAME: Oakdale WHP RANK:
WELL NAME: Well #3 UNIQUE WELL #: 00208454

COUNTY: Washington TOWNSHIP NUMBER: 29 RANGE: 21 W SECTION: 18 QUARTERS: AADB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	3	
Geologic Data From	:	Well Record	
Year Constructed	:	1969	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	424	0
Well Depth	:	510	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	2 04/19/2005	10
Maximum tritium detected	:	8.6 07/10/2012	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	M	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		

COMMENTS
This well was sampled again for tritium on 8/21/01 and tritium was present at a value of 15.2 TU.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820016 TIER: 1
SYSTEM NAME: Oakdale WHP RANK:
WELL NAME: Well #5 UNIQUE WELL #: 00127287

COUNTY: Washington TOWNSHIP NUMBER: 29 RANGE: 21 W SECTION: 29 QUARTERS: BCBC

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	1978	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	436	0
Well Depth	:	520	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	2.3 04/09/2014	10
Maximum tritium detected	:	6 07/10/2012	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		40
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS
THIS WELL IS CONSIDERED VULNERABLE BASED ON TRITIUM DATA FROM CITY WELLS 3 AND 7.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820016 TIER: 1
SYSTEM NAME: Oakdale WHP RANK:
WELL NAME: Well #6 UNIQUE WELL #: 00151575

COUNTY: Washington TOWNSHIP NUMBER: 29 RANGE: 21 W SECTION: 6 QUARTERS: CACA

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	2	
Geologic Data From	:	Well Record	
Year Constructed	:	1984	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	387	5
Well Depth	:	471	
Casing grouted into borehole?		Unknown	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1400	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	1.1 09/23/1994	10
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		55
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS
THIS WELL IS CONSIDERED VULNERABLE BASED ON TRITIUM DATA FROM CITY WELLS 3 AND 7.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820016 TIER: 1
SYSTEM NAME: Oakdale WHP RANK:
WELL NAME: Well #7 UNIQUE WELL #: 00463534

COUNTY: Washington TOWNSHIP NUMBER: 29 RANGE: 21 W SECTION: 29 QUARTERS: DB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Very low	0
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	1990	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	467	0
Well Depth	:	563	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	2.6 08/21/2013	10
Maximum tritium detected	:	7 08/21/2001	VULNERABLE
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		20
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS
VULNERABLE BASED ON TRITIUM DATA FROM OTHER CITY WELL.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820016 TIER: 1
SYSTEM NAME: Oakdale WHP RANK:
WELL NAME: Well #8 UNIQUE WELL #: 00572608

COUNTY: Washington TOWNSHIP NUMBER: 29 RANGE: 21 W SECTION: 20 QUARTERS: B

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	0	
Geologic Data From	:	Well Record	
Year Constructed	:	1996	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	381	5
Well Depth	:	463	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1000	10
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	2.1 07/26/2006	10
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		45
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS
THIS WELL IS CONSIDERED VULNERABLE BASED ON TRITIUM DATA FROM CITY WELLS 3 AND 7.

625 Robert St. N. St. Paul MN 55155
P.O. Box 64975 St. Paul MN 55164 - 0975

MINNESOTA DEPARTMENT OF HEALTH
SECTION OF DRINKING WATER PROTECTION
SWP Vulnerability Rating

PWSID: 1820016 TIER: 1
SYSTEM NAME: Oakdale WHP RANK:
WELL NAME: Well #9 UNIQUE WELL #: 00611059

COUNTY: Washington TOWNSHIP NUMBER: 29 RANGE: 21 W SECTION: 30 QUARTERS: ADB

CRITERIA		DESCRIPTION	POINTS
Aquifer Name(s)	:	Jordan	
DNR Geologic Sensitivity Rating	:	Low	20
L Score	:	1	
Geologic Data From	:	Well Record	
Year Constructed	:	2001	
Construction Method	:	Cable Tool/Bored	0
Casing Depth	:	441	0
Well Depth	:	517	
Casing grouted into borehole?		Yes	0
Cement grout between casings?		Yes	0
All casings extend to land surface?		Yes	0
Gravel - packed casings?		No	0
Wood or masonry casing?		No	0
Holes or cracks in casing?		Unknown	0
Isolation distance violations?			0
Pumping Rate	:	1200	20
Pathogen Detected?			0
Surface Water Characteristics?			0
Maximum nitrate detected	:	1.8 07/26/2006	10
Maximum tritium detected	:	Unknown	0
Non-THMS VOCs detected?			0
Pesticides detected?			0
Carbon 14 age	:	Unknown	0
Wellhead Protection Score	:		50
Wellhead Protection Vulnerability Rating	:		VULNERABLE
Vulnerability Overridden	:		Jim Walsh

COMMENTS
THIS WELL IS CONSIDERED VULNERABLE BASED ON TRITIUM DATA FROM CITY WELLS 3 AND 7.

APPENDIX D

ASSESSMENT OF DATA ELEMENTS

Assessment of the Data Elements

This table 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.

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	L	M	M	M	MN Climatology Office
Geology					
Maps and geologic descriptions	M	H	H	H	MGS
Subsurface data	M	H	H	H	MGS, MDH, CWI
Borehole geophysics	M	H	H	H	MGS
Surface geophysics	L	L	L	L	Not Available
Maps and soil descriptions	L	L	M	M	NRCS
Eroding lands					
Water Resources					
Watershed units	M	H	H	H	DNR, USGS
List of public waters	M	H	H	H	DNR
Shoreland classifications					
Wetlands map					
Floodplain map					
Land Use					
Parcel boundaries map	L	H	L	L	Washington County, Oakdale
Political boundaries map	L	L	L	L	Oakdale, MnGEO
PLS map	L	H	L	M	MnGEO, MDH
Land use map and inventory					
Comprehensive land use map					
Zoning map					
Public Utility Services					
Transportation routes and corridors	L	M	L	L	MnGEO, MnDOT
Storm/sanitary sewers and PWS system map	L	M	M	M	Oakdale
Oil and gas pipelines map					
Public drainage systems map/list	L	H	M	M	Oakdale
Records of well construction, maintenance, and use	H	H	H	H	Oakdale, CWI, MDH Files
Surface Water Quantity					
Stream flow data	L	M	L	L	DNR, USGS
Ordinary high water mark data	L	M	L	L	DNR, USGS

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	
Permitted withdrawals	L	L	L	L	DNR
Protected levels/flows	L	L	L	L	DNR
Water use conflicts	L	L	L	L	DNR
Groundwater Quantity					
Permitted withdrawals	H	H	H	H	DNR, Oakdale
Groundwater use conflicts	L	L	L	L	DNR
Water levels	H	H	H	H	CWI, MDH, Oakdale

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	
Surface Water Quality					
Stream and lake water quality management classification					
Monitoring data summary	L	L	M	M	SWCD
Groundwater Quality					
Monitoring data	H	H	H	H	MDH
Isotopic data	H	H	H	H	MDH
Tracer studies	H	H	H	H	Not Available
Contamination site data	M	M	H	M	MPCA, MDH
Property audit data from contamination sites					
MPCA and MDA spills/release reports	M	M	M	L	MPCA, MDA

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

Acronyms used in this report are listed on page ii, after the “Glossary of Terms.”

APPENDIX E

ELECTRONIC DATA FILES

(see attached files on CD-ROM)