Wellhead Protection Plan

for the

City of Pelican Rapids

Variable Vulnerability Setting

City Council Approved August 30, 2016

Forward

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

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

Water Supply Wells Included in This Plan

Local Well ID	Unique Number	Use/ Status[1]
Well 7	215513	P
Well 8	215511	P
Well 9	215512	P
Well 13	445082	P
Well 15	753273	P

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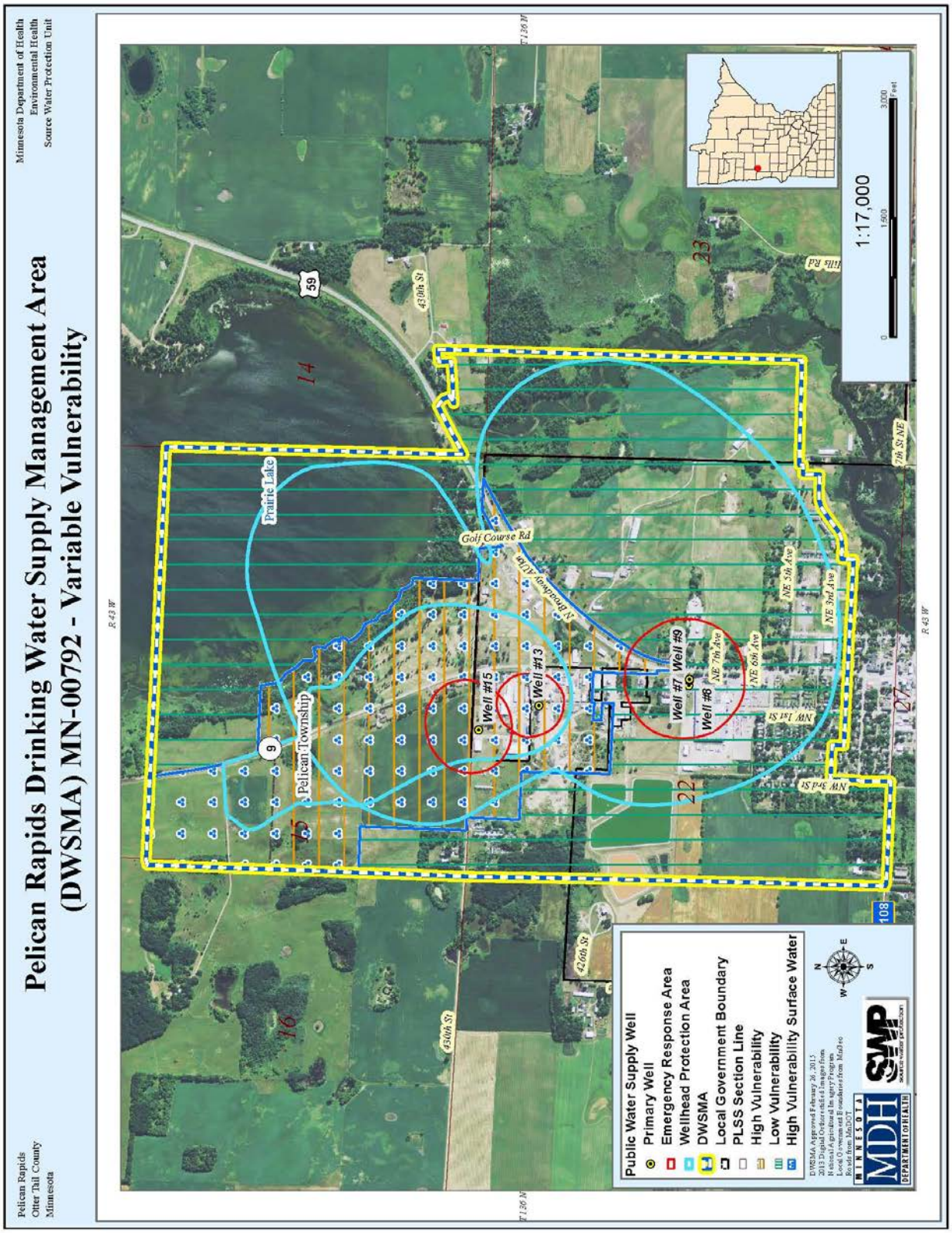

Chapter 1: Introduction

1.1 Background

The wellhead protection (WHP) plan for the City of Pelican Rapids was prepared in cooperation with the Minnesota Department of Health (MDH) and the Minnesota Rural Water Association. It contains specific actions that the city will take to fulfill WHP requirements that are specified under Minnesota Rules, part 4720.5100 to 4720.5590. Also, the support that Minnesota state agencies, federal agencies, and Otter Tail County will provide is presented to identify their roles in protecting the city's drinking water supply. The plan is effective for 10 years after the approval date specified by MDH and the city is responsible for implementing its WHP plan of action as described in Table 10 of this report. Furthermore, the city will evaluate the status of plan implementation at least every two and one half years to identify whether its WHP plan is being implemented on schedule.

1.2 Plan Appendices

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

- Appendix I contains the assessment of data elements used to create this plan.
- Appendix II contains the first part of the plan, consisting of the delineation of the wellhead protection area (WHPA), the drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply wells and the DWSMA. This part of the plan is summarized in Chapter 3.
- Appendix III contains the inventory of potential contamination sources that may present a risk to the city's drinking water. This part of the plan is discussed in Chapter 4 in terms of assigning risk to the city's water supply and is discussed as issues, problems or opportunities summarized in Chapter 6.
- Appendix III contains the contingency strategy to provide for an alternate water supply if there is a disruption caused by contamination or mechanical failure. This part of the plan is discussed in Chapter 11.
- Appendix IV contains the required scoping II documentation required by MN Dept. of Health.

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

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

The first scoping meeting that was held on December 2, 2014 addressed the data elements that were needed to support the delineation of the WHPA, the DWSMA, and the well and DWSMA vulnerability assessments. The second scoping meeting that was held on April 6, 2015 discussed the data elements required to 1) identify potential risks to the public water supply and 2) develop effective management

strategies to protect the public water supply in relation to the well and DWSMA vulnerability. The results of each meeting were communicated to the city by MDH through a formal scoping decision notice.

Each data element is required to be assessed for its impact on 1) the use of the public water supply well, 2) delineation of the WHPA, 3) the quality and quantity of water supplying the public water supply wells, and 4) land and groundwater uses within the DWSMA. This information is found in Appendix I.

The availability of the information relating to each data element that is used in this plan was evaluated by staff from the MDH, the City of Pelican Rapids and MRWA. During the evaluation process the City of Pelican Rapids and Minnesota Department of Health determined if the data element was considered an issue, concern or opportunity that the City of Pelican Rapids must address in this plan. If this is found to be the case during data evaluation and assessment, the information will be found in Appendix II. Actions that are needed to address deficiencies found during the data element assessment process in either the quality or the amount of data are included in the plan of action (Chapter 9).

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

The boundaries of the WHPA and DWSMA and the DWSMA vulnerability are shown in Figure 1, and well vulnerability is listed below in Table 1. A detailed description of the process used for 1) delineating the WHPA and the DWSMA, and 2) preparing the vulnerability assessments of the city water supply well(s) and DWSMA is presented in Appendix I. The City of Pelican Rapids requested that MDH do this work; it was performed by Trent Farnum, who is licensed as a geoscientist by the State of Minnesota.

Table 1 - Water Supply Well Information

Local Well ID	Unique Number	Use/ Status[1]	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed/ Reconstructed	Aquifer[2]	Well Vulnerability
Well 7	215513	P	12 x 10	388	420	1961	QBAA	Not Vulnerable
Well 8	215511	P	8 x 6	387	422	6/17/1964	QBAA	Not Vulnerable
Well 9	215512	P	16 x 12	387	422	8/7/1964	QBAA	Not Vulnerable
Well 13	445082	P	12	78	108	10/2/1987	QWTA	Vulnerable
Well 15	753273	P	12	380	420	8/14/2007	QBAA	Not Vulnerable

Note: 1. Primary (P), Emergency Backup (E), Seasonal Use (S)

DWSMA Vulnerability Assessment

The significance of this assessment relative to the likelihood that a contaminant may move from a potential source to the source water aquifer is summarized below in terms of a travel time. Generally,

the higher the vulnerability rating, the greater the risk that a released contaminant may result in contaminated drinking water. These ratings are show in Figure 1 and were determined using geologic, soils, and groundwater chemistry information.

- Very high vulnerability indicates that vertical recharge to the source water aquifer occurs over a time period of hours to weeks.
- High vulnerability indicates that vertical recharge to the source water aquifer occurs over a time period of weeks to years.
- Moderate vulnerability indicates that vertical recharge to the source water aquifer occurs over a time period of years to several decades.
- Low vulnerability indicates that vertical recharge to the source water aquifer occurs over a time period of several decades to a century
- Very low vulnerability indicates that vertical recharge to the source water aquifer occurs over a time period that exceeds a century.

The City of Pelican Rapids has been assigned a high vulnerability for the aquifer recharging the shallow public supply well. A surface water contribution area is also part of the shallow well delineation and was assigned a high vulnerability since this area has the ability to deliver runoff into the groundwater capture area very rapidly. The rest of the city wells (deep wells) are well protected from activities at the land surface and thus have been assigned a low vulnerability rating.

Chapter 4: Assigning Risk to Potential Contamination Sources

The types of potential contamination sources that may exist within the DWSMA were derived from the information collected to satisfy the data element requirements (Chapter 2). The 1) results of the assessment of DWSMA and well vulnerability and 2) the presence or absence of human-caused contaminants in the source water were used to guide the risk assessment to potential sources of contamination. Table 2 indicates the risk that the City of Pelican Rapids has assigned to potential point sources of contamination that are located within the IWMZ. This assessment also reflects the risk assessment that MDH has assigned to them in the sanitary survey report. Table 3 indicates the risk that the City of Pelican Rapids has assigned to potential point sources of contamination that are located in the remainder of the DWSMA beyond the IWMZ whereas, Table 4 indicates this risk attributed to potential non-point sources of contamination.

4.1 Contaminants of Concern

No manmade contaminants of concern have been detected in the city wells above the drinking water standards.

4.2 Inventory Results and Risk Assessment

A map and description of the locations of potential contamination sources are presented in Appendix III and 1) a summary of the results for the IWMZ is listed in Table 2, and 2) for the remainder of the DWSMA in Table 3.

The priority assigned to each type of potential contamination source addresses 1) the number inventoried, 2) its proximity to a city well, 3) the capability of local geologic conditions to absorb a contaminant, 4) the effectiveness of existing regulatory controls, and 5) the time required for the City of Pelican Rapids to obtain cooperation from governmental agencies that regulate it.

- A **high (H)** risk potential implies that the potential source type has the greatest likelihood to negatively impact the city water supply and should receive highest priority for management.
- A **moderate (M)** risk potential implies that the potential source type may have an impact on the city water supply and should receive an intermediate priority for management.
- A **low (L)** risk potential implies that a potential source type may have a marginal or negligible impact on the city water supply and should receive a low priority for management.

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

Source Type	Total	Level of Risk
Buried Sewer Lines	5	High
Stormwater Intakes	2	Low
Sewage Holding Tank – Watertight	1	High
Test Wells	10	High

*Spills along the travel corridors within this area however could pose as potential threats to the city's drinking water supply.

Table 3 - Potential Point Contamination Source Type and Assigned Risk

Potential Contaminant Source Type	Number Within DWSMA and Level of Risk	Status of Potential Contaminant Source	Level of Risk
Private Wells	50	Active	High
Individual Sewage Treatment System	19	Active	Medium
Aboveground Storage Tank	2	Active	High
Hazardous Waste Generator	7	Active	Medium
Hazardous Waste Generator	1	Inactive	Low
Cemetery	1	Active	Low
Gravel Pit	1	Active	High
Public Supply Wells	5	Active	Low
Chemical Storage and Prep Area	2	Active	High

Table 4 - Nonpoint Sources of Potential Contamination and Assigned Risk for the DWSMA

Land Use Category	Total Acres and Assigned Risk	
Emergency Response Area (ERA)		
Agricultural (Row Crop)	9.5	H
Commercial	22	H
Developed, Low Intensity (Residential)	2	L
Drinking Water Supply Management Area		
Open Water	213	L
Developed, Open Space	139	L
Developed, Low Intensity (Residential)	64	M
Developed, Medium Intensity (Commercial)	53	H
Developed, High Intensity (Commercial)	17	H
Barren Land (Rock/Sand/Clay)	1	L
Deciduous Forest	116	L
Evergreen Forest	19	L
Shrub/Scrub	3	L
Grassland/Herbaceous	34	L
Pasture/Hay	247	L
Cultivated Crops	226	H
Woody Wetlands	10	L
Emergent Herbaceous Wetlands	54	L

The higher the priority assigned to the land uses above the greater risk that land use has for contaminating the aquifer from which the city draws water.

Chapter 5: Impact of Land and Water Use Changes on the Public Water Supply Well(s)

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

Table 5 - Expected Land and Water Use Changes

Expected Change (Physical Environment, Land Use, Surface Water, Ground Water)	Impact of the Expected Change On the Source Water Aquifer	Influence of Existing Government Programs and Regulations on the Expected Change	Administrative, Technical, and Financial, Considerations due to the Expected Change
Some residential development is likely to occur.	Slight increase in water demand on the current wells.	Any future developments will be connected to city services and the city has adequate water storage and supply so very limited impact.	Slightly higher demand for water and a slight increase in tax revenue. No significant changes are anticipated.
No changes to the physical makeup of the aquifer are expected.	NA	NA	NA

Chapter 6: Issues, Problems, and Opportunities

6.1 Identification of Issues, Problems and Opportunities

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

6.2 Comments Received

There have been several occasions for local governments, state agencies and the general public to identify issues and comment on the city's WHP plan. At the beginning of the planning process, local units of government were notified that the city was going to develop its WHP plan and were given the opportunity to identify issues, as well as to comment. A public information meeting was held to review the results of the delineation of the WHP area, DWSMA, and the vulnerability assessments; meetings of the WHP team were open to the public. Also, a public hearing was held before the completed WHP plan was sent to MDH for state agency review and approval.

Table 6 - Issues, Problems and Opportunities

Issue Identified	Impacted Feature	Problem Associated with the Identified Issue	Opportunity Associated with the Identified Issue	Adequacy of Existing Controls to Address the Issue
Limited well logs (geological information) was available in the Pelican Rapids area.	Aquifer, Well Water Quality, DWSMA	Groundwater in the DWSMA is not well understood and thus the delineation was completed on limited data.	The City working in cooperation with the MN Dept. of Health (MDH) will identify wells within 2 miles of the DWSMA boundary and particularly the high priority wells identified by the MDH Hydrologist.	The MDH can provide valuable financial and technical assistance in locating wells and assisting in gathering geological information.
It is always difficult to foresee or plan for every threat or potential contaminant source which may affect Pelican Rapids in the future.	Aquifer, DWSMA, Well Water Quality	The City may not be prepared technically or financially to address potential threats unknown to them at this time.	If a critical issue or potential contaminant threat becomes an issue in the future for the City, the city can ask for assistance from the various state agencies and MRWA to promptly take actions to prevent this contaminant source from contaminating their drinking water supply. Grants dollars may also be available to help cover various cost and equipment.	Not applicable at this time.
The City of Pelican Rapids has limited resources and funds to implement the wellhead protection plan.	Aquifer DWSMA Well Water Quality	With limited resources implementing the WHP plan will be a challenge for the City of Pelican Rapids.	Form partnerships with the Township, County and State agencies who have controls in the DWSMA so they can help with implementation.	Not applicable
Some of the DWSMA is outside the city limits.	Aquifer, DWSMA, Well Water Quality	Water is recharging the city's aquifer from lands outside the city limits. The city has no landuse controls or authority over these areas.	The city will need to work cooperatively with Otter Tail County and Pelican Township to ensure smart landuse decisions are made outside city limits.	Otter Tail County has zoning authority over this area and can provide valuable assistance in landuse issues.
Spill response equipment/expertise is not readily available.	Aquifer, Well Water Quality	The city and first responders are not prepared to adequately respond to a spill within their DWSMA.	The city and first responders can work cooperatively with local and state government to develop and implement a spill response plan to handle issues which may arise within the DWMSA.	Adequate controls exist at the state level however greater awareness and tools are necessary at the City of Pelican Rapids.
Some row crop	Aquifer,	Row crop production	The city will need to	Nutrient management is a

production occurs in the highly vulnerable wellhead protection area.	Well Water Quality	tends to leak nitrates into the aquifer.	work cooperatively with local units of government and state agencies to address nutrient management within the WHPA.	voluntary action and there are limited regulation and enforcement at the local and state end to regulate fertilizer and manure application rates.
The City has old municipal wells which have not been properly sealed.	Aquifer, Water Quality	Wells which have not been sealed according to MDH standards may provide a pathway for pollutants to enter into the aquifer.	With the assistance of MDH the city can locate, assess and seal the wells if they pose a threat to the city's drinking water supply.	MDH Well Management has the ability to require the city to properly address unused improperly sealed wells. The city can utilize the MDH WHP and MDH Well Mgmt. grant programs to seal wells.
New high capacity wells drilled within the DWSMA or 1 mile of the DWSMA may alter the WHPA boundary and provide a pathway for pollutants to enter the aquifer.	Aquifer, DWSMA and water well quantity and quality.	The City has no authority over construction or placement of new wells or pumping rates which may influence the capture area for the City's wells. A large capacity well could potentially impact the public water supply wells ability to supply water.	If a high capacity well is proposed within the DWSMA or 1.5 miles of the DWSMA boundary the DNR will notify MDH. Cooperate with MDH and DNR Hydrologists as requested to help assess any potential impacts and work cooperatively with the high capacity well owner, DNR and MDH Hydrologist resolve any potential negative impacts.	Current state law and rules are considered adequate insofar as requiring all wells to be constructed according to state well construction codes and setbacks. MN DNR will notify the city if a high capacity well is to be drilled within the DWSMA.

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

In addition to its own controls, the City of Pelican Rapids will have to rely upon partnerships formed with local units of government, state agencies, and federal agencies with regulatory controls or resource management programs in place to help implement its WHP plan. The level of support that a local, state, and federal agency can provide to help offset the risk that is presented by a potential contamination source will depend up on its legal authority as well as the resources that are available to local governments.

7.1 Existing Controls and Programs of the City of Pelican Rapids

The city has identified the following legal controls and/or programs that it has in-place that can be used to support the management of potential contamination sources within the DWSMA.

Table 7 – Existing Controls and Programs of the City of Pelican Rapids

Type of Control	Program Description
Zoning and Conditional Use Permits	Sets standards and orderly growth for land uses within City limits and allows the City to apply permit conditions to land uses they deem necessary.
Shoreland Ordinance	Regulates the subdivision, use and development of the shorelands of public waters.
Subdivision Control Ordinance	Mandates the connection with a community or public water supply and the community or public sanitary sewer collection and treatment facility.
Water & Sewer Ordinance	Regulates the connection to the City water or sanitary sewer system.

7.2 Local Government Controls and Programs

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

Table 8 - Local Agency Controls and Programs

Government Unit	Name of Control/Program	Program Description
Otter Tail County	Shoreland Ordinance	Enforces the building setback and septic requirements set forth by the MN DNR.
	Household Hazardous Waste Collection.	Provides education to landowners and a collection program for disposing of household hazardous waste.
	Water Planning	Establishes countywide goals and priorities towards protecting water resources.
	Subsurface Sewage Treatment System (SSTS) Ordinance	Sets minimum standards for permitting design and construction of SSTSs.
Otter Tail County Emergency Management Dept.	Transportation accidents causing contaminant spills	Directs the response and the extent of initial clean-up of fuel, chemical, or other hazardous substances that are released due to transportation accidents.
Otter Tail County Soil and Water Conservation District	1) Agricultural BMPs 2) Storm water management 3) Wetland management 4) Feedlots 5) Residential BMPs	The Otter Tail SWCD promotes the protection of water and soil resources in the county through educational programs, cost-sharing and collaboration with other local, state and federal agencies.
Pelican Township	Zoning Ordinance Building Code	Enforces the placement and building of structures within the township.

7.3 State Agency and Federal Agency Support

MDH will serve as the contact for enlisting the support of other state agencies on a case-by-case basis regarding technical or regulatory support that may be applied to the management of potential contamination sources. Participation by other state agencies and the federal government is based on legal authority granted to them and resource availability. Furthermore, MDH 1) administers state regulations that affect specific potential sources of contamination and 2) can provide technical assistance for property owners to comply with these regulations.

The following table identifies specific regulatory programs or technical assistance that state and federal agencies may provide to the City of Pelican Rapids to support implementation of its WHP plan. It is likely that other opportunities for assistance may be available over the ten-year period that the plan is in effect due to changes in legal authority or increases in funding granted to state and federal agencies. Therefore, the table references opportunities available when the city's WHP plan was first approved by MDH.

Table 9 - State and Federal Agency Controls and Programs

Government Unit	Type of Program	Program Description
MN Dept. of Health	State Well Code (MR Chapter 4725)	MDH has authority over the construction of new wells and sealing of wells. MDH staff in the Well Management Program offers technical assistance for enforcing well construction, maintaining setback distances for certain contamination sources, and well sealing.
MN. Dept. of Health	Wellhead Protection	MDH can provide technical and financial assistance to the city for whp activities and can help identify technical and financial support that other governmental agencies can provide to assist with managing potential contamination sources.
MN Dept. of Natural Resources	Water Appropriation Permitting (MR Chapter 6115) Shoreland	DNR can require that anyone requesting an increase in existing permitted appropriations or to pump groundwater must address concerns of the impacts to drinking water if these concerns are include in a WHP plan. Establishes special requirements for landuse and soil disturbances within shoreland areas along protected waters.
MN Pollution Control Agency (MPCA)	Feedlot Rules Registered Storage Tank Program Stormwater Program	Establishes minimum state-wide standards for feedlot regulations and regulates feedlots >1000 animal units. MPCA administers the programs dealing with storage tank regulations and stormwater management.
MN Dept. of Agriculture (MDA)	Nutrient and Chemical Programs	MDA administers the programs which regulate the storage and application of nutrients and chemicals (pesticides and herbicides) and provide in field technical advice to farmers located within the DWSMAs.

U.S. Dept. of Agriculture (USDA)	Farm Bill Programs	The local USDA Service Center can provide technical and financial support for individuals and farmers through the Farm Bill.
Environment Protection Agency (EPA)	Shallow Disposal Well Program	EPA has the regulatory authority over Class V Injections Well or also known as Shallow Disposal Wells.

7.4 Support Provided by Nonprofit Organizations

The Minnesota Rural Water Association will assist the City of Pelican Rapids with implementing its WHP plan by providing 1) reference education and outreach materials for landowners, 2) technical support for implementing individual WHP action items listed in the plan, and 3) assisting the City with assessing the results of plan implementation.

Chapter 8: Goals

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

- **The overall goal of the City of Pelican Rapids is to promote public health, economic development and community infrastructure by maintaining a potable drinking water supply for all residents of the community, both now and into the future.**

Chapter 9: Objectives and Plan of Action

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

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

9.1 Objectives

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

A. Create awareness and general knowledge about the importance of WHP in the Pelican Rapids Community and the City of Pelican Rapids DWSMA.
B. Properly inventory and manage potential contaminant sources to protect the drinking water supply for the City of Pelican Rapids.
C. Gather additional information within the DWSMA in order to better understand the size and vulnerability of the DWSMA.

D. Effectively track and report the implementation efforts and wellhead protection plan progress to all governing authorities.
E. Manage the Inner Wellhead Management Zone to prevent contamination of the aquifer near the public supply wells.
F. Effectively prepare the City of Pelican Rapids for disruptions to the water distribution system.
G. Develop local land use controls and partner with local units of government to better protect the aquifer used by the City of Pelican Rapids.

9.2 WHP Measures and Action Plan

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

The following categories are used to further clarify the focus that each WHP measure provides as well as help to organize the measures listed in the action plan:

- Data Collection
- IWMZ Management
- Land Use Management
- Potential Contamination Source Management
- Public Education and Outreach
- Reporting and Evaluation
- Water Use and Contingency Strategy

9.3 Establishing Priorities

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

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

Based upon the factors listed above, the WHP team has identified WHP measures that will be implemented by the city over the 10-year period that this plan is in effect and assigned an appropriate priority ranking.

The objective that each measure supports is noted as well as 1) the lead party and any cooperators, 2) the anticipated cost for implementing the measure and 3) the year or years in which it will be implemented. The following table lists each measure that it will implement over the ten-year period that the city's WHP plan is in effect, as well as the priority that it has assigned to each measure.

Table 10 - WHP Plan of Action

Measure	Priority	Public Education and Outreach	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
1	High	The City of Pelican Rapids will notify the residents and businesses in Pelican Rapids that the City has an approved wellhead protection plan and share with them the general themes included in the plan. The City will share this information through a city newsletter article and through a direct mailing to the landowners with potential contaminant sources within the DWSMA that do not receive the city newsletters. Direct traffic to the city website for educational materials/bmps.	A	MDH, MRWA	$100	●									
2	High	Place WHP educational materials and Best Management Practices factsheets on the city website. Information is available via the MN Rural Water website. The BMP factsheets will include topics such as; well management, storage tank management, hazardous waste materials management and agricultural chemical storage and prep management etc…	A	MDH, MRWA	$400	●	●								

Measure	Priority	Potential Contaminant Source Management	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
3	High	Promote the implementation of Conservation Reserve Program (CRP) and other conservation programs which are available via USDA and other state and local agencies to farmers within the DWSMA. Apply for a SWP grant to possibly help provide financial incentive payments or help cover seeding cost for willing landowners if requested by the SWCD. Items such as the "Cropland Conservation Practices for Protect Drinking Water" booklet as well as other educational materials are available via MRWA, MDA and the local USDA Service Center.	B	USDA, Otter Tail Co. SWCD, MRWA, MDA	$5,000 - $10,000		●	As Needed							
4	High	Promote the sealing of abandoned or unused wells and the proper management of active wells within the DWSMA. Provide educational materials to all well owners (identified in the PCSI) on how to manage private wells.	B	MDH	$5,000		●								

Measure	Priority	Potential Contaminant Source Management	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
5	Low	Cooperate with MDH and DNR Hydrologists as requested to help assess any potential impacts on the public water supply well(s) or aquifer if a high capacity well is proposed within the DWSMA or 1 mile of the DWSMA boundary. If impacts are identified, cooperatively work with the high capacity well owner, DNR and MDH Hydrologist to identify and resolve any potential negative impacts.	B	MDH, DNR	Staff Time	As Needed									
6	Low	Notify MDH of the location of any Class V wells which are inventoried in the future.	B	MDH, EPA	Staff Time	As Needed									
7	High	Mail the County Highway Department, MN DOT and Pelican Township a map of the DWSMA and ask that they take into consideration this area when they are conducting road construction or maintenance projects (i.e. storm water devices, fuel and construction equipment management and maintenance, chemical use, etc.). This is especially important within the Inner Wellhead Management Zone and the high vulnerability area of the WHPA.	B	Otter Tail County HWY, MN DOT, Pelican Twp.	Staff Time		●								
8	Medium	Contact the MPCA and ask the Storage Tanks program to notify the city when changes are made to storage tanks within the DWMSA and communicate the risk to the city of any storage tanks or leaky storage tank sites.	B	MPCA	Staff Time		●	As needed	As needed	As needed	As needed	As needed	As needed	As needed	As needed
9	Medium	The City will partner with Otter Tail County and host a household hazardous waste pickup event.	B	Otter Tail County	Staff Time	●	●	●	●	●	●	●	●	●	●
10	High	Request technical and financial assistance from MDH for locating, prioritizing and properly sealing of unused or abandoned (private and old municipal) wells located in the DWSMA. Apply for MDH grant to seal wells in the DWSMA deemed to be a risk to the aquifer used by city. Complete the work once grant funds have been secured.	B	MDH	$10,000	●	●	●							
11	High	Provide educational materials regarding the proper management of aggregate mining pits and associated practices to the owners of the aggregate mining businesses in the DWSMA. Educational materials are available via MRWA, MDH (Issue Papers) and MPCA. Explore the option of applying for a grant to provide incentives for reclamation and proper management of the gravel pits etc…	B	MRWA, MDH, Township, MPCA	$5,000		●	●	As Needed	As Needed	As Needed	As Needed	As Needed	As Needed	As Needed
12	High	It is always difficult to foresee or plan for the future. The City will use its planning and management capabilities within this plan to help respond to new/unknown source water protection issues that may impact the quality or quantity of its drinking water in the future.	B		Staff Time	As Needed									

Measure	Priority	Land Use Management	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
13	High	The City will assess their land use controls and ordinances to determine if there are areas where better protection for the drinking water supply could be provided. Example – Adoption of a private well ordinance	G	City Council	Staff Time		●								
14	High	Continue to develop and maintain the good line of communication between the City, Otter Tail County and Pelican Township in order to remain abreast of any land use changes which are pending within the City's DWSMA. Send a letter to the County and Township requesting the formal opportunity to provide comments on pending landuse changes within the DWSMA. Some examples include evaluating the placement of new structures, septic compliance etc…	G	Otter Tail Co., Pelican Twp.	Staff Time		●								
15	High	Request the County and Township review their existing land use ordinances to determine if appropriate measures are in place to protect drinking water sources. If the land use ordinance lacks sufficient measures to protect drinking water supplies assist the County and Township in helping to develop protective ordinances and measures. If they do not have any land use ordinances encourage them to consider drinking water protection when or if they adopt land use controls. MDH, MRWA and League of MN Cities can provide assistance in this effort.	G	Otter Tail Co., Pelican Township, MDH, MRWA, League of Cities	Staff Time		●								

Measure	Priority	IWMZ Management	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
16	High	Implement the WHP Measures and Findings in the current and future IWMZ Inventories.	B, E	MDH	Staff Time					●					●
17	High	Work with MDH to ensure that setback distances for new potential contamination sources are met.	B, E	MDH	Staff Time	On-going									
18	High	Assist MDH staff in completing future Inner Wellhead Management Zone Inventories for the public water supply wells.	B, E	MDH	Staff Time			●			●			●	

Measure	Priority	Data Collection	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
19	High	Re-sample Wells 7, 8, 9, 13, and 15, (or whatever primary wells exist at the time) during year six of plan implementation for vulnerability parameters determined in consultation with MDH (probably tritium, chloride, bromide, nitrate and ammonia); contingent on funding assistance from MDH for sampling and analysis. It is likely that MDH will provide sample bottles, but the city may need to collect the samples and ship them to MDH. Sampling will occur if funding is available via MDH.	C	MDH Otter Tail Co. SWCD MDA MRWA	Staff Time						●				
20	High	MDH will provide well logs for any new wells drilled between 2013-2022, within two miles of the DWSMA in year 8 of plan implementation. The city will conduct a table top exercise to determine if the well logs are associated with the right locations.	C	MDH	Staff Time								●		
21	High	The City will work cooperatively with MDH to identify the following high priority wells identified by the MDH Hydrologist. 1) 102013, Pelican Rapids, 120'deep 2) 102014, City of Pelican Rapids, 120'deep 3) 102015, City of Pelican Rapids, 120' deep 4) 102049, City of Pelican Rapids, 120' deep 5) 568221, Mw#1 Park Region Co-op, 50' deep 6) 574571, Smith, Wayne, 152' deep 7) 679745, Johnson, Ed, 80' deep 8) 740292, Innovative Construction, 130' deep 9) 753267, Pelican Rapids, 431' deep 10) 796223, Erickson, Randy, 87' deep	C	MDH	Staff Time							●	●		

Measure	Priority	Emergency Contingency Planning	Objective Addressed	City Measure Unless Cooperator is Noted	Cost	Implementation time frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
22	High	Request assistance from the MPCA and County Emergency Response staff to help develop a spill response plan for the City which the Fire Department and First Responders can incorporate into their existing emergency response plan.	F	MPCA, Otter Tail County, Fire Dept. and First Responders	$1,000				●						
23	High	Explore the option of providing training to local First Responders to enable them to be better prepared to respond to emergencies which directly affect the City's drinking water supply (i.e. spills etc…). Purchase necessary equipment for the First Responders to enable to address events which might pollute the City's drinking water.	F	MPCA, Otter Tail County, and First Responders	$500 - $1,000				●						
24	High	Update the Water Supply Plan	F		Staff Time									•	

25	Low	Contact the county to see if they will include the DWSMA map in the county dispatch manual.	F	Otter Tail County	Staff Time						●				
26	High	The city will assess their backup power situation and explore the option of applying for a MDH WHP grant to purchase a generator and install the necessary wiring to power their wells during extended periods of power outages. If the grant is awarded the city will complete the project. (1) The city will apply for a grant to install the necessary wiring as the first step. (2) The city will apply for a grant to purchase a generator as the second step.	F	MDH	$10,000		●	●							

Evaluation and Reporting – Implementation Action Items															
Action	Priority	Description	Objective Addressed	Cooperators	Cost	Implementation Time Frame									
						2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Action 27	Medium	<u>Implementation, Tracking and Reporting Activities</u> Maintain a "WHP folder" that contains documentation of WHP activities you have completed.	D	MDH, MRWA	Staff Time	●	●	●	●	●	●	●	●	●	●
Action 28	High	<u>WHP Program Evaluation Plan Reporting:</u> Complete an Evaluation Report every 2.5 years that evaluates the "progress of plan of action and the impact of a (any) contaminant release on the aquifer supplying the public water supply well" MN WHP Rule 4720.5270. This evaluation will be mailed to the MDH Planner upon completion. This evaluation is available on the MRWA website.	D	MDH, MRWA	Staff Time			●			●			●	

9.4 Commitments from Co-Operators

The agencies listed in Table 10 have indicated that they will support the City of Pelican Rapids with implementing the WHP measure(s) in which they are identified.

Agency Name – Measure Number	**Agency Name – Measure Number**
MDH – 1, 2, 4, 5, 6, 11, 15, 16, 17, 18, 19, 20, 26, 27, 28	Otter Tail County – 7, 9, 14, 15, 22, 23, 25
MRWA -1, 2, 3, 11, 15, 19, 27, 28	Otter Tail County SWCD – 3, 19
MN DNR – 5	Environmental Protection Agency – 6, 14
Fire Dept & First Responders – 22, 23	MPCA – 8, 11, 22

MN Dept. of Ag. – 3, 19	USDA – 3
MN DOT – 7	Pelican Township – 7, 11, 14, 15
League of Cities – 15	

Chapter 10: Evaluation Program

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

1. An annual briefing to the city council will provide the basis for documenting whether each action step for that year was implemented.
2. The WHP team will meet at a minimum every two and one half years to assess the status of plan implementation and to identify issues that impact implementation of action steps throughout the DWSMA.
3. The city will assess the results of each action item that has been taken annually to determine whether the action item has accomplished its purpose or whether modification is needed. Assessment results will be presented in the annual report to the city council.
4. The city will prepare a written report that documents how it has assessed plan implementation and the action items that were carried out. The report will be presented to MDH at the first scoping meeting that it will hold with the city to begin amending the WHP plan.

Chapter 11: Contingency Strategy

The WHP plan must include a contingency strategy that addresses disruption of the water supply that is caused either by contamination or mechanical failure. The city has a DNR approved Water Supply Plan. The approval documentation is included in the Appendix IV of this plan.

Chapter 12: Glossary of Terms

Conjunctive Delineation. A WHP area that is defined by two components consisting of 1) the capture zone for a well that is based on generating flow pathlines within the subsurface area(s) of contribution and 2) a surface area that may contribute recharge to the capture zone.

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

Drinking Water Supply Management Area (DWSMA). The surface and subsurface areas surrounding a public water supply well, including the WHP area, that must be managed by the entity identified in the WHP plan. (MR4720.5100, subpart 13). This area is delineated using identifiable landmarks that reflect the scientifically calculated WHPA boundaries as closely as possible.

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

Emergency Standby Well. A well that is pumped by a public water supply system only during emergencies, such as when an adequate water supply cannot be achieved because one or more primary or seasonal water supply wells cannot be used.

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

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

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

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

Seasonal Water Supply Well. A well that is only used to provide drinking water during certain times of the year. either when pumping demand cannot be met by the primary water supply well(s), or for a facility, such as a resort, that is closed to the public on a seasonal basis.

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

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

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

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

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

Chapter 13: References

References are located in Appendix II

Appendices

Appendix I - Assessment of Data Elements Used to Prepare This Plan

Appendix II - WHPA and DWSMA Delineations and Vulnerability Assessments

Appendix III – Potential Contaminant Source Inventory

Appendix IV Contingency Strategy

Appendix V - Required Documentation

APPENDIX I Assessment of Data Elements Used to Prepare This Plan

The following data elements were identified by the MDH to be used in the WHP plan and were specified in the scoping decision notices that were presented to the city of Pelican Rapids. The selection of a data element for inclusion in the plan is based on 1) the hydrogeological setting 2) vulnerability of the wells used by the city of Pelican Rapids, and 3) vulnerability of the DWSMA known at the time that each scoping meeting was held. Each data element is assessed for its impact on 1) the use of the public water supply well, 2) delineation of the WHPA, 3) the quality and quantity of water supplying the public water supply well, and 4) land and groundwater uses within both the moderate and highly vulnerable in the DWSMA.

I. Data Elements Relating to the Physical Environment

Precipitation - Synopsis of Available Data: Precipitation data from the city's wastewater plant is included as an exhibit in Appendix V of this plan and includes information from the years 2010 – 2015. The data shows an annual average for Otter Tail County to be 26 inches, with the majority of the precipitation falling in the late spring to late summer months.

Geology and Soils - Synopsis of Available Data: Existing geological maps, reports, and studies that were used are for this plan is listed in the "Selected References" section of Appendix II. Soils information was obtained from the Otter Tail County soil survey (Harms, 1965) that was prepared by the U.S. Natural Resource Conservation Service (http://datagateway.nrcs.usda.gov/). This information is part of Appendix V as an exhibit and was used to refine the understanding of the surficial geology and used in conjunction with other geologic and groundwater quality data to define the DWSMA vulnerability. A comprehensive discussion of the soils and geologic information's impact on the DWSMA is included in Appendix II.

Water Resources - Synopsis of Available Data: The sources and application of the required water resource data collected for use in this plan is described at length in Appendix II. The Pelican Rapids DWSMA is locating within the Red River and Ottertail River Major Watersheds and has the Pelican River running through the southern end of the low vulnerable DWSMA. Prairie Lake is the only lake located within the DWSMA and there are a few wetlands located within the highly vulnerable wellhead protection area. There are no identified public drainage ditches or protected waters identified within the highly vulnerable portions of the DWSMA.

Assessments of the Physical Environment Data and Their Impact On The Following:
(a) Use of the PWS Wells: According to the data collected, the amount of precipitation received is adequate to provide recharge to the city's wells and to meet current demand.
The soils information provides insight into the pathways that recharging water takes to enter the aquifer. Soils and geology in the Pelican Rapids DWSMA influence vertical recharge of the precipitation to the aquifer. Factors such as rainfall intensity, soil type, slope, vegetation, thickness of soil cover over bedrock, and bedrock characteristics influence the rate and amount of precipitation or surface water that infiltrates to the aquifer. The areas that are designated as highly vulnerable--where there is little soil cover over the bedrock, or fractured bedrock over the aquifer and where

more coarsely-grained soils are present-- infiltration reaches the aquifer more quickly. Precipitation is less of an issue in the area of the DWSMA that are designated as having low vulnerability. It is thought that the water resources data element information has no direct impact on the use of the PWS wells.

(b) Delineation of the WHPA: Precipitation provides recharge from surface water infiltration that influences the size of the WHPA and affects the use of the wells and the amount of groundwater that can be pumped without damage to the aquifer and surface water resources. The soils and geologic information was used to address aquifer transmissivity and hydrologic boundaries delineation criteria and was the principal information used to assess DWSMA vulnerability, of which it was determined that there are high and low vulnerable areas within the protection area. Also, since there are permeable soils at the surface, it is expected that precipitation and runoff from upland areas will infiltrate to the aquifer used by the city. Because of these factors, a surface water contribution area (SWCA) was delineated that includes any topographically higher area that may contribute runoff to the capture zones (See Appendix II, Figures). Specific water resources data element information was used to identify surface water hydrologic features that define hydrologic boundaries impacting delineation of the WHPA and the vulnerability of the DWSMA.

(c) Quality and Quantity of Water Supplying the PWS Wells: Precipitation data is used as an input for predicting nitrate leaching from agricultural fields to aid in prioritizing areas that need increased nutrient management within the DWSMA. The areas within the DWSMA that are characterized as highly vulnerable have a greater potential to be impacted from vertical infiltration from precipitation and surface water runoff from the SWCA. The geologic and soils information provides insight into the pathways that recharging water takes to enter the aquifer.

(d) Land and Groundwater Uses With In the DWSMA: Precipitation, when used to assess contaminant loading to the aquifer, affects the use of land and groundwater resources within the DWSMA because it is influencing potential contaminant loading to an aquifer. The geologic and soils information was used to determine the vulnerability of the aquifer to contamination from land use activities in the DWSMA. For those areas in the DWSMA that are highly vulnerable, an inventory of all land uses in this area (both presently occurring and historical) should be included, and management strategies developed in this plan to address the level of risk, as determined by the wellhead protection team, to the groundwater supply posed by each relevant potential contaminant source identified. Those areas within the DWSMA that are categorized as having low vulnerability due to a the increased level of protection provided by soils and geologic features as compared with the areas designated as highly vulnerable-- should identify land use sources which penetrate the geologic protection (wells and Class V wells). Non-point runoff is extremely important to manage in the SWCA due to the ability of area to provide runoff laden in pollutants to the highly vulnerable area of the DWSMA where vertical infiltration near the wells occurs. Water resources information affects the use of land and water resources within the DWSMA because it defines regulations that are in place to assist with managing 1) the uses for surface water and 2) potential contamination sources that may contribute contaminants to the aquifer used by the city of Pelican Rapids. Shore land classifications and Land Use/Zoning regulations can affect the management of the DWSMA because they offer a tool to help manage landuses within the DWSMA. The city of Pelican Rapids can work with Otter Tail County's administrators and Township Officials who possess the authority to restrict or prohibit future potential contamination sources that may introduce contamination into groundwater by recharge from surface water features, especially within the highly vulnerable areas within the DWSMA.

II. Data Elements Relating to the Land Use

Land Use – Synopsis of Available Data: The Pelican Rapids DWSMA is located in Otter Tail County. While a small portion of the DWSMA includes land that is outside the Pelican Rapids city limits (Pelican Township), the vast majority is located within corporate limits. Existing maps of political boundaries and parcel boundaries are required to be included in this plan and can be found as exhibits in Appendix V. Information pertaining to parcel boundaries, fence lines, U.S. Public Land Survey coordinates, as well as the center lines of roads were obtained from the Otter Tail County.

The 2011 land use map from the National Land Use Database (Appendix V), and the existing Pelican Rapids Zoning map (Appendix V) were analyzed to determine local land uses. The comprehensive land use map was also included in Appendix V. Current land use within the DWSMA includes agricultural production, commercial businesses, and rural and urban residential, with the majority of the land in the DWSMA being agricultural production.

Maps and data tables containing information about historical and current land uses and potential contaminant sources located within the DWSMA are incorporated in the potential contaminant source inventory (PCSI) and inner wellhead management zone (IWMZ) surveys for the Pelican Rapids wells in Appendix III of this plan. As a result of the soils and geologic information available and used in the development of the DWSMA and assessment of the vulnerability, the potential sources of contamination for the highly vulnerable area include all land uses occurring, due to the lack of protective cover over the ground water aquifer and its greater susceptibility to impact. In the areas identified in the DWSMA to be low vulnerable, having some degree of protection of the drinking water aquifer, only wells and Class V wells were required to be included in the inventory. The IWMZ surveys identified some potential sources of contamination within the 200-foot radius of either city well that will require the attention of the city to ensure they do not pollute the drinking water (Appendix III). The land use information gathered during the PCSI indicates that there are the following potential contaminant sources within the DWSMA for consideration of this plan: domestic wells in the areas not served by the Pelican Rapids municipal system, agricultural crop production lands where nitrogen fertilizers may/are used, potential residential sites where unused/unsealed wells may be located, underground storage tanks for petroleum products, hazardous waste generators and leaking underground storage tank (LUST) sites to name a few.

Public Utility Services – Synopsis of Available Data: Information in Appendix V relating to the public utility services indicate that the portion of the DWSMA located with the city are equipped with municipal sanitary sewer services, water services and a storm water collection system. The area located in the DWSMA, but outside the city does not have municipal utility services and must rely on private domestic wells and individual sewage treatment systems for their water source and sanitary sewage treatment. Information pertaining to the construction and maintenance of the public water supply wells is included in Appendix II (Tables 1-4). State Highway 59 and County Highway 9 runs through or along the edge of the highly vulnerable portion of the DWSMA and heavy commercial traffic carrying many different kinds of potentially hazardous materials over it.

There are no public drainage ditches, or natural gas and oil pipelines located within the DWSMA.

Assessments of the Land Use Data and Their Impact On The Following:
(a) Use of the PWS Wells: Information relating to the parcel boundaries, public land survey coordinates, center lines of roads have no direct impact on the use of the public water supply wells.

Priorities assigned to the action steps in the plan are based on information relating to the comprehensive land use and zoning maps and can impact the use of the Pelican Rapids wells by using the information as a tool to direct land use activities that can either increase, or decrease the amount of water required to be produced by the city wells.

Information relating to the potential contaminant sources within the DWSMA have the ability impact the use of the PWS wells in the event that the sources begin to contribute contaminants to the ground water aquifer that begin appearing in ground water monitoring results. Ground water contamination of the aquifer that the city utilizes for their drinking water may result in the necessity to limit use of a well, or discontinue the use of the well altogether.

The distribution of the public water supply system, specifically the amount of water storage and treatment capabilities, affects the amount of pumping that is needed to meet water supply needs and to maintain potability standards.

(b) Delineation of the WHPA: Information relating to the parcel boundaries, public land survey coordinates, and centerlines of roads have no impact on the delineation of the WHPA.

The public water supply distribution system influences the number of wells that must be pumped to meet water demands of the public, which affects the boundaries of the WHPA and emergency response area (ERA).

The pumping of the city's wells affects the delineation of the WHPA because the pumping amount is a delineation criterion.

(c) Quality and Quantity of Water Supplying the Wells: Information relating to the parcel boundaries, public land survey coordinates, and center lines of roads have no impact on the quality and quantity of water supplying the Pelican Rapids wells.

The information in Appendix V relating to the comprehensive land use and zoning maps provides the basis for defining the types of potential contamination sources that may or do impact the quantity and quality of the well water used by the public water supply.

Information about land uses within the PCSI is important to the quality of the water supplying the city's wells because it includes locations and data about potential contaminant sources within the DWSMA have the ability to introduce contaminants into the drinking water aquifer that the city uses as its drinking water source. The highly vulnerable portions of the DWSMA are more susceptible to contamination from land use activities, and therefore more likely to have a greater impact on the quality of the city's drinking water than land uses within the low vulnerable areas.

The information related to the transportation routes and corridors, sanitary sewer system, and the lack of a municipal storm water collection system can all be considered potential contaminant sources, and have the ability to impact the city's quality and quantity of drinking water.

(d) Land and Groundwater Uses In the DWSMA: Information relating to the parcel boundaries, public land survey coordinates, and center lines of roads have impact on the land and groundwater uses in the DWSMA because they define where the WHP plan will be implemented.

The comprehensive land use and zoning maps affect land and water use within the DWSMA because they provide a basis for limiting future land uses that may be incompatible with ordinances of planning goals. As such, they may be used for denying new potential contamination sources or imposing performance standards that affect the use of existing or new public water supply wells and the quantity and quality of the well water used by the city of Pelican Rapids. The effective use of these tools will be most critical in the highly vulnerable areas of the DWSMA where the aquifer being used for the city's drinking water source may be more susceptible to contamination from land uses.

Information about land uses within the PCSI is important to the land and groundwater uses within the DWSMA because the inventory identifies locations of various land uses that have been known to contribute to ground water contamination. The city is able to use the inventory, in conjunction with land use controls at the City, to reduce the likelihood of seeing an impact to their drinking water from these potential contaminant sources. In the highly vulnerable areas of the DWSMA where land use activities have the potential to impact the city's drinking water, the city can use the land use and zoning maps along with existing zoning ordinances to disallow certain land uses, or direct land use activities to areas that will see less impact to the groundwater quality, or place restrictions on land use permits in order to prevent contamination from activities to occur. Low vulnerable areas will be influenced by zoning requirements and State Statue dealing with the well code.

The transportation routes and corridors, municipal sanitary sewer system, individual septic systems and wells etc….all represent potential contamination sources. As such, they may limit future land and groundwater uses because of historical contamination releases or the risk that they may present to public health and safety.

III. Data Elements Relating to Water Quantity Information

Surface and Ground Water Quantity Information – Synopsis of Available Data: Information relating to water quantity was obtained for both surface and groundwater resources during the WHPA delineation efforts and is contained and discussed in detail in Appendix II.

High, Mean, and Low Flow Rates of Streams – Synopsis of Available Data: No streams are located within the highly vulnerable DWSMA.

Lakes (Defined High Water Marks), Surface Water Withdrawals, and Lakes and Streams (State- Defined Levels or Flows) – Synopsis of Available Data: There are no streams or lakes located within the highly vulnerable DWSMA.

A List of Wells Covered by State Appropriations Permits, Including the Amounts of Water Appropriated, Type of Use, and Aquifer Source – Synopsis of Available Data: The City of Pelican Rapids provided the information describing pumping for the water supply wells over the previous five years, and the projected pumping for the first five years of plan implementation. The

total, annual pumping volumes of high-capacity wells in the Pelican Rapids area were obtained from the State Water Use Data System (SWUDS) which is maintained by the DNR. SWUDS data, combined with well construction records in the County Well Index (CWI), were used to identify other high-capacity wells that may need to be included in the delineation process because they constitute a flow boundary. Existing data used for the development of this plan is contained in Appendix II.

Well Interference Problems and Water Use Conflicts – Synopsis of Available Data: Information pertaining to this topic was searched for during the WHPA delineation process. There are no known well interference problems or water use conflicts were reported by Pelican Rapids or the DNR.

State Environmental Bore Holes and Related Information –Synopsis of Available Data:
No existing environmental borehole information was identified within the DWSMA or used for the delineation of the WHPA.

Assessments of the Water Quantity Data and Its Impact On The Following:
(a) Use of the PWS Wells: Water quantity (both surface and groundwater) data impacts the use of the public water supply well because a maximum annual amount for the public water supply system is specified under the DNR appropriations permit.

Information related to the pumping of high-capacity wells in or near the DWSMA may impact the use of the Pelican Rapids wells because the use of the high-capacity wells has the ability to influence the direction of flow of groundwater as well as existing contaminant plumes in an area. If an area near the city's wells becomes contaminated, the city may be required to change the current use of the wells to slow the progression of a plume towards the city's wells, or prevent a contaminant plume from entering the drinking water supply.

(b) Delineation of the WHPA: Water quantity (both surface and groundwater) data impacts the WHPA delineation because the pumping amounts are used to calculate the daily well discharge, which is a WHPA delineation criterion.

Data relating to the high, mean and low flow rates of streams affects the delineation of the WHPA because it is used to 1) determine the interconnectivity between surface water and the aquifer used by the Pelican Rapids wells, and 2) calibrate the groundwater model that was used to delineation the WHPA. Also, the interaction between surface water and the aquifer that is used as the source of drinking water affects the vulnerability of the wells and DWSMA. There are areas of both high and low vulnerable areas within the Pelican Rapids DWSMA.

Information related to the pumping of high-capacity wells is used for the delineation of the WHPA because it may present a flow boundary (which is a delineation criterion), and may affect the movement of groundwater flow in an area.

(c) Quality and Quantity of Water Supplying the Wells: Water quantity (both surface and groundwater) may only indirectly affect the future quantity and quality of the water from the public water supply wells, if at all.

The data related to the pumping of high-capacity wells in or near the DWSMA has the ability to impact the quality and quantity of water supplying the city's wells because 1) the amount of water

being pumped by these high-capacity wells have the ability to affect the static water levels of the aquifer, and 2) the pumping of these wells can influence the direction of ground water flow and the direction of flow of existing contaminant plumes.

(d) Land and Groundwater Uses Within the DWSMA: Water quantity (both surface and groundwater) data impacts the land and groundwater uses within the DWSMA because pumping may impact whether other wells or existing land uses may cause contamination of the aquifer or contamination to move toward the public water supply wells.

Land and groundwater uses within the DWSMA may be influenced by the pumping of high- capacity wells in or near the DWSMA when recharge is less than withdrawal, such as during times of drought. The result of this would require that the city enact stricter water conservation measures for its system users, or may limit certain types of land uses with its jurisdiction in order to ensure that higher priority water users' demands are satisfied.

IV. Data Elements Relating to Water Quality Information

Surface Water Quality Information – Synopsis of Available Data: There is one surface water body within the DWSMA, Prairie Lake and through monitoring efforts during the original wellhead protection plan was determined not to be connected to the city's drinking water supply.

Ground Water Quality Information – Synopsis of Available Data: The city has historically experienced safe drinking water which meets all drinking water standards (Consumer Confidence Report located in Appendix V.

Assessments of the Water Quality Data and Its Impact On The Following:
(a) Use of the PWS Wells: Information related to ground water quality is generally used to characterize the rate of recharge to the aquifer used by the city of Pelican Rapids for its drinking water supply, and the degree of hydraulic connection between it and surface hydrologic features. Also, the presence of human-made or naturally occurring contaminants may influence pumping of the public water supply well because pumping may impact the rate at which contamination may be moving into the aquifer. Furthermore, the level of contamination may require that the water be treated for potable use or be blended with other water to reduce contaminant levels to drinking water standards.

(b) Delineation of the WHPA: Information related to ground water quality is used to assess the pathways that recharge takes to the aquifer which may impact the selection of methods that are used to delineate the WHPA and to assess well and DWSMA vulnerability. The presence of human-made contaminants is used to 1) calibrate a groundwater flow model by providing a means of checking travel time distance from the source of a contaminant to a public water supply well, and 2) assess the vulnerability of the well and the DWSMA. The presence of naturally occurring contaminants is used to assess the extent that the source water aquifer is isolated from surface water recharge.

(c) Quantity and Quality of Water Supplying the Wells: Ground water quality data influences the quality of the water supplying the wells (especially in the highly vulnerable areas of the DWSMA) due to the ability of contaminants in the aquifer can be introduced on the land surface, infiltrate through the soils and reach the aquifer where it can travel, over time, and reach the city's wells.

(d) Land and Groundwater Uses In the DWSMA: The presence of human-made contaminants indicated by groundwater monitoring is used to identify potential sources of contamination should receive a high priority for inventory and for providing support that is assigned to objectives and actions in the plan that manage these sources.

APPENDIX II
WHPA and DWSMA Delineations and Vulnerability Assessments

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Amendment to the Wellhead Protection Plan

Part I

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

For

City of Pelican Rapids

January 2015

Trent Farnum, P.G., Hydrologist
Source Water Protection Unit

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Appendix A

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Glossary of Terms

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

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

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

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

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

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

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

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

Acronyms

CWI - County Well Index

DNR - Minnesota Department of Natural Resources

DPS – Department of Public Safety

EPA - United States Environmental Protection Agency

FSA - Farm Security Administration

MDA - Minnesota Department of Agriculture

MDH - Minnesota Department of Health

MGS - Minnesota Geological Survey

MnDOT - Minnesota Department of Transportation

MnGEO - Minnesota Geospatial Information Office

MODFLOW – Three-Dimensional Finite-Difference Groundwater Model

MPCA - Minnesota Pollution Control Agency

NRCS - Natural Resource Conservation Service

SWCD - Soil and Water Conservation District

UMN - University of Minnesota

USDA - United States Department of Agriculture

USGS - United States Geological Survey

Executive Summary

This summary documents the amended delineation of the protection areas for the public water supply wells used by city of Pelican Rapids and includes an assessment of their vulnerability to contamination. These were initially prepared in February of 2005 and must now be amended as the city's wellhead protection plan has nearly expired.

The recharge area for the wells is known as the wellhead protection area, or WHPA, and represents the area that contributes a 10-year pumping volume to the city's wells. The area represented by a one-year volume is known as the emergency response area, or ERA. Practical reasons require the designation of a management area that fully envelops the wellhead protection area, called the drinking water supply management area, or DWSMA. Each of these areas is shown in Figure 1. Figure 8 shows how these areas have changed since they were originally delineated. The changes are the result of the addition and subtraction of wells to the city's water supply system (Table 1), changes in water use, and advances in hydrogeologic information and modeling tools.

The city of Pelican Rapids uses one shallow well screened in a Quaternary Water Table Aquifer and four deep wells screened in a Quaternary Buried Artesian Aquifer. The shallow well lacks sufficient natural geologic protection and is considered vulnerable to contamination. The four deeper wells are sufficiently deep and well-constructed and are considered to have a low vulnerability to contamination. Available data suggest that high vulnerability exists in the DWSMA near the 10-year capture zone for the shallow well and that low vulnerability observed at the deep city wells is consistent throughout the rest of the DWSMA. At present, none of the contaminants of concern for which the Safe Drinking Water Act has established standards are present in the city's water supply.

Where high vulnerability of the DWSMA exists the city of Pelican Rapids must be diligent in managing a variety of potential sources of contamination. The low vulnerability over much of the rest of the DWSMA means that the chief contamination threats to the city of Pelican Rapids deep aquifer are other wells that reach or penetrate it. Old and unused wells may provide a conduit for contaminants to short circuit the natural geologic protection and are considered a principal threat to the city's drinking water source.

The following report outlines the steps taken to delineate the city of Pelican Rapids WHPA, DWSMA and ERA.

Introduction

The Minnesota Department of Health (MDH) is amending Part I of the wellhead protection (WHP) plan at the request of the city of Pelican Rapids (PWSID 1560019). The work was performed in accordance with the Minnesota Wellhead Protection Rule, parts 4720.5100 to 4720.5590.

This report presents updates to the delineations of the wellhead protection areas (WHPAs) and drinking water supply management area (DWSMA), and the vulnerability assessments for the public water supply wells and DWSMA. Figure 1 shows the boundaries for the WHPA and the DWSMA. The WHPA is defined by a 10-year time of travel. Figure 1 also shows the emergency response area (ERA), which is defined by a one-year time of travel. Definitions of rule-specific terms used are provided in the "Glossary of Terms."

In addition, this report documents the technical information required to prepare this portion of the WHP plan in accordance with the Minnesota Wellhead Protection Rule. Additional technical information is available from MDH.

Table 1 lists all the wells in the public water supply system, including those that have been removed since the last delineation. Only wells listed as primary are required to be included in the WHP plan.

Table 1 - Water Supply Well Information

Local Well ID	Unique Number	Use/ Status[1]	Casing Diameter (inches)	Casing Depth (feet)	Well Depth (feet)	Date Constructed/ Reconstructed	Aquifer[2]	Well Vulnerability
Well 7	215513	P	12 x 10	388	420	1961	QBAA	Not Vulnerable
Well 8	215511	P	8 x 6	387	422	6/17/1964	QBAA	Not Vulnerable
Well 9	215512	P	16 x 12	387	422	8/7/1964	QBAA	Not Vulnerable
Well 13	445082	P	12	78	108	10/2/1987	QWTA	Vulnerable
Well 15	**753273**	**P**	**12**	**380**	**420**	**8/14/2007**	**QBAA**	**Not Vulnerable**
Well 5A	241506	S	24	112	132	Sealed 9/30/2010	QWTA	Vulnerable
Well 10	241508	S	12	89	123	Sealed 9/29/2010	QWTA	Vulnerable
Well 11	241509	S	8	93	111	Sealed 9/29/2010	QWTA	Vulnerable
Well 12	144068	S	12	82	120	Sealed 7/20/2010	QWTA	Vulnerable
Well 14	629321	S	12	80	105	Sealed 9/28/2010	QWTA	Vulnerable

Note: 1. Primary (P), Sealed (S)
2. Quaternary Buried Artesian Aquifer (QBAA), Quaternary Water Table Aquifer (QWTA)
3. Shaded wells removed from flow since last delineation
4. Bolded wells new since last delineation.

Assessment of the Data Elements

MDH staff met with representatives of the city of Pelican Rapids on December 2, 2014, for a scoping meeting that identified the data elements required to amend Part I of the WHP plan. **Table 2** presents the assessment of these data elements relative to the present and future implications of planning items specified in Minnesota Rules, part 4720.5210.

Table 2 - Assessment of Data Elements

Data Element	Present and Future Implications				Data Source
	Use of the Well (s)	Delineation Criteria	Quality and Quantity of Well Water	Land and Groundwater Use in DWSMA	
Precipitation	L	L	L	L	NOAA, USGS
Geology					
Maps and geologic descriptions	M	H	H	H	MGS, DNR, USGS
Subsurface data	M	H	H	H	MGS, MDH,
Borehole geophysics	M	H	H	H	None Available
Surface geophysics	L	L	L	L	None Available
Maps and soil descriptions	H	H	H	H	NRCS
Eroding lands					
Water Resources					
Watershed units	L	L	L	L	USGS, DNR
List of public waters	L	L	L	L	USGS, DNR
Shoreland classifications					
Wetlands map	L	L	L	L	USGS, NWI
Floodplain map					
Land Use					
Parcel boundaries map	L	H	L	L	Ottertail County
Political boundaries map	L	H	L	L	MnGEO, City
Public Land Survey map	L	H	L	L	MnGEO
Land use map and inventory					
Comprehensive land use map					
Zoning map					
Public Utility Services					
Transportation routes and corridors	L	L	L	L	MnDOT, MnGEO
Storm/sanitary sewers and PWS system map					
Oil and gas pipelines map	L	L	L	L	DPS
Public drainage systems map or list	L	L	L	L	City, MnDOT, MnGEO
Records of well construction, maintenance, and use	H	H	H	H	City, CWI, MDH

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 Quantity					
Stream flow data	L	L	L	L	USGS
Ordinary high water mark data	L	L	L	L	USGS, DNR
Permitted withdrawals					
Protected levels/flows	L	L	L	L	USGS, DNR
Water use conflicts	L	L	L	L	USGS, DNR
Groundwater Quantity					
Permitted withdrawals	H	H	H	H	DNR
Groundwater use conflicts	H	H	H	H	DNR
Water levels	H	H	H	H	None Available
Surface Water Quality					
Stream and lake water quality management classification					
Monitoring data summary	L	L	L	L	MDH
Groundwater Quality					
Monitoring data	H	H	H	H	MPCA, MDH
Isotopic data	H	H	H	H	MDH
Tracer studies	H	H	H	H	None Available
Contamination site data	M	M	M	M	MPCA
Property audit data from contamination sites					
MPCA and MDA spills/release reports	M	M	M	M	MPCA

- **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."

General Descriptions

o Description of the Water Supply System

The city of Pelican Rapids obtains its drinking water supply from five primary wells. **Table 1** summarizes general construction information and vulnerability status.

o Description of the Hydrogeologic Setting

Pelican Rapids is located on the northern edge of the Alexandria Moraine complex. This is a north-south ridge of unconsolidated glacial materials deposited along the margins of several ice sheets that covered Minnesota during the last Ice Age (Quaternary Period). These glaciers piled about 350 to 400 feet of primarily clayey till with some sand layers above crystalline bedrock in the Pelican Rapids area.

The city of Pelican Rapids draws groundwater from both a Quaternary Water Table Aquifer (shallow aquifer) used by Well 13 and a Quaternary Buried Artesian Aquifer (deep aquifer) used by Wells 7, 8, 9 and 15. These aquifers consist of discontinuous lenses of fine to coarse sand and gravel. The water table aquifer is locally exposed at the land surface and otherwise has only limited geologic protection in the form of thin overlying clay-rich sediments. The buried artesian aquifer is separated from both the land surface and the water table aquifer by clay-rich sediments that are sufficiently thick to provide it with a significant amount of geologic protection. Locally, a review of logs for the city wells has determined an approximate thickness of 135 feet of semi-continuous sand exists in the shallow unconfined aquifer in which Well 13 is screened; whereas, a sand thickness of approximately 50-feet is identified at the deep aquifer wells.

Regional groundwater flow in the shallow unconfined unit is southerly with apparent interaction with the Pelican River. Regional groundwater flow in the deep confined unit is more south-westerly with the major drainage feature being the Red River approximately 30 miles southwest.

A description of the hydrogeologic setting for the aquifers used to supply drinking water is presented in Table 3.

Table 3 - Description of the Hydrogeologic Setting

Attribute	Descriptor	Data Source
Aquifer Material	Sand and Gravel	Well Records and the CWI Database
Porosity Type and Value	Primary 20%	Fetter, 2001
Aquifer Thickness	Variable: 12-160 ft (shallow aquifer), variable: 35-52 ft (deep aquifer)	Well Records and the CWI Database
Stratigraphic Top Elevation	~1,270 – 1,400 ft shallow aquifer ~960 – 1,050 ft deep aquifer	Well Records and the CWI Database
Stratigraphic Bottom Elevation	~1,220 – 1,290 ft shallow aquifer ~920 – 1,000 ft deep aquifer	Well Records and the CWI Database
Hydraulic Confinement	Shallow aquifer is unconfined, deep aquifer is confined	Well Records and the CWI Database
Transmissivity	Range of Values: 376 – 74,520 ft^2/day shallow aquifer 182 – 8,611 ft^2/day deep aquifer	A range of transmissivity values was used to reflect changes in aquifer composition and thickness as well as uncertainties related to the quality of existing aquifer test data. See Table 4 for the reference value.
Hydraulic Conductivity	Range of Values: 10 – 552 ft/day shallow aquifer 3 - 87 ft/day deep aquifer	The range of values was derived using specific capacity data obtained from well records and/or from additional aquifer test results listed in the "Selected References" section of this report.
Groundwater Flow Field	Groundwater flow is southwesterly with an approximate compass direction of 190° and gradient of 0.0009 in the shallow aquifer and westerly with an approximate compass direction of 235° and gradient of 0.0016 in the deep aquifer (Figures 2a and 2b).	Defined by using static water level elevations from well records in the CWI database and documents listed in the "Selected References" section of this report.

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

Delineation of the Wellhead Protection Area

o Delineation Criteria

The boundaries of the WHPAs for the city of Pelican Rapids are shown in Figure 1. **Table 4** describes how the delineation criteria specified under Minnesota Rules, part 4720.5510, were addressed.

Table 4 - Description of WHPA Delineation Criteria

Criterion	Descriptor	How the Criterion was Addressed
Flow Boundary	Pelican River, Prairie Lake, Lake Lizzie, Lake Lida, Pelican Lake, Tamarack Lake, Sand Lake and Buffalo River-Otter Tail River Watershed divide	Lakes and rivers where added as head boundaries. Buffalo River Watershed was added as a no flow boundary for the shallow aquifer.
Flow Boundary	Geologic boundaries	Analysis of aquifer test and specific capacity data suggests that the transmissivity of both the shallow and deep aquifer systems varies with proximity to the city wells. This was simulated in the model by the differing hydraulic conductivity spatially.
Flow Boundary	Other High-Capacity Wells Table 6	The pumping amounts were determined using the same approach used for the public water supply wells and were included in the methods used for the delineation.
Daily Volume of Water Pumped	See Table 5	Pumping information was obtained from the DNR, Groundwater Appropriations Permit No. 1973-4006, and converted to a daily volume pumped by a well.
Groundwater Flow Field	See Figure 2	The model calibration process addressed the relationship between the calculated versus observed groundwater flow field. Oneka was used to evaluate the uncertainty of the wells' capture areas based on the simplified conceptual model and regional flow, recharge and local well data.
Aquifer Transmissivity (T)	Reference Value: 64,069 ft^2/day shallow aquifer proximal to City Wells 2,895 ft^2/day deep aquifer proximal to City Wells 4,936 ft^2/day shallow aquifer distal to City Wells 475 ft^2/day deep aquifer distal to City Wells	The aquifer test plan was approved on December 8, 2014, and T was determined from specific capacity tests for the shallow aquifer and a pumping test for the deep aquifer. Uncertainty regarding aquifer transmissivity was addressed as described in Section 4.4.
Time of Travel	10 years	The public water supplier selected a 10-year time of travel.

Pumping data was obtained from the DNR Permit and Reporting System (MPARS) for the public water supply's Groundwater Appropriation Permit No. 1973-4006. These values, confirmed by the public water supplier, were used to identify the maximum volume of water pumped annually by each well over the previous five-year period, as shown in **Table 5**. An estimate of the pumping for the next five years is also shown. The maximum daily volume of discharge used as an input parameter in the model was calculated by dividing the greatest annual pumping volume by 365 days.

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

Well Name	Unique No.	2009	2010	2011	2012	2013	5-Year Projection	Daily Volume (cubic meters)
Well 7	215513	35.582	30.972	35.682	**37.245**	36.710	No Increase Expected	386
Well 8	215511	21.299	19.877	21.267	**22.862**	21.011	No Increase Expected	237
Well 9	215512	33.612	34.767	38.820	41.633	**43.004**	No Increase Expected	446
Well 13	445082	32.320	27.674	36.307	39.553	**39.610**	No Increase Expected	411
Well 15	753273	**57.800**	55.355	50.279	46.285	43.126	No Increase Expected	599

(Expressed as millions of gallons. Bolding indicates greatest annual pumping volume.)

In addition to the wells used by the public water supplier, Table 6 shows other high-capacity wells included in the delineation to account for their pumping impacts on the capture areas for the public water supply wells. Pumping data was obtained from the DNR MPARS database.

Table 6 - Other Permitted High-Capacity Wells

Unique Number	Well Name	DNR Permit Number	Aquifer	Use	Annual Volume of Water Pumped (millions of gallons)	Daily Volume (cubic meters)
571735	Prairie T Farm	1997-1026	QBAA	Agricultural Crop Irrigation	24.61	255

o Method Used to Delineate the Wellhead Protection Area

The WHPA for the city of Pelican Rapids wells was determined using a combination of two methods. The first method utilized a groundwater flow model using the software code MODFLOW (McDonald and Harbaugh, 1988). The other method used the stochastic analytical groundwater flow method Oneka (Barnes and Soule, 2003). The resulting WHPA boundaries are a composite of the capture zones calculated using these two approaches (Figure 1). The input files for both models are available at MDH upon request and the methodology is described further below. The first method used the numerical groundwater flow code MODFLOW, specifically the software code MODFLOW2000 version 1.15.01 (Hill et al., 2000). MODFLOW was developed by the United States Geological Survey and is publically available. The program has been thoroughly documented, is widely used by consultants, government agencies and researchers and consistently accepted in regulatory proceedings. MODFLOW is also an extremely versatile program capable of simulating groundwater in up to three dimensions while offering a variety of boundary condition options, confined or unconfined aquifer conditions and allowing for vertical discretization through the use of layering.

The numerical groundwater model that was constructed consisted of 382 rows, 407 columns and three layers. The model incorporates a variable areal grid spacing ranging from 5 meters near the city wells and grading to 160 meters at the boundaries of the model domain. Layer 1 corresponds to the shallow unconfined aquifer (variable, averages 80 feet thick), Layer 2 represents the clay unit overlying the deep confined sand aquifer (approximately 230 feet thick) and Layer 3, the deep confined sand aquifer (variable, averages 50 feet thick). Layer tops and bottoms were derived from CWI logs within the

model domain. The model contains three different types of boundary conditions. General head boundaries represent a head-dependent boundary normally used along the edge of a model to allow groundwater flow into and out of a model for establishing a regional flow field. No flow boundaries are cells where flow cannot occur, and are implicitly represented as the boundaries of the model domain where no other head boundaries are used and at the bottom of Layer 3. River head boundaries represent cells where water is flowing both into and out of the aquifer and were used to simulate the many lakes and rivers within the model domain within Layer 1. Vertical recharge was applied to Layer 1 of the model using values published by the U.S Geological Survey (Delin et al., 2007). Ranges of hydraulic conductivity values were first estimated from literature review for Layer 2 (0.002 ft/d, Fetter, 2001) and then refined with specific capacity and aquifer test data within the model domain (Layers 1 and 3). Due to the heterogeneity of the unconsolidated sand and the lack of contiguous lenses for discretization of hydraulic conductivity zones, site specific data within the model domain was interpolated using the Parameter Estimation (PEST) tool. PEST is a calibration tool developed by John Doherty of Watermark Computing and is most commonly used to estimate aquifer hydraulic conductivity (Doherty, 2010). Typical zonation of hydraulic conductivity introduces zones of different hydraulic conductivity in the model domain at locations where the modeler feels they would "do the most good." The parameter zonation process would then be repeated until the fit between model outcomes and field observations was acceptable. Characterization of geologic heterogeneity in the model domain by zones of piecewise uniformity is not in harmony with the nature of the alluvial material, therefore any zonation pattern that is finally decided upon is only defensible on the basis that it is better to employ such a zonation scheme than to ignore geologic heterogeneity altogether. To overcome this problem the distribution of hydraulic conductivity within the model domain was described by a set of pilot points. The pilot point locations and values in the model domain were derived from specific capacity data at domestic wells and aquifer test data for the city wells. These values were then smoothed with the geostatistical method of kriging and input into Layers 1 and 3. The pilot point method allowed for hydraulic conductivity values to be representative of the city well data proximal to the city well field and then be smoothed further away.

To determine the WHPA, the groundwater flow model was used along with a particle tracking program called MODPATH (Pollock, 1994). MODPATH is used to evaluate advective transport of simulated particles moving through the simulated flow system. A series of 36 particles were launched at each well. A porosity of 20 percent was used for both aquifers used by the city and a reverse time of travel was calculated at 10 years.

The second method, using the analytical groundwater flow code named Oneka (Barnes and Soule, 2003), was used to assess the probability of impacts that local variations in hydrogeologic conditions may have on a well capture zone. This model treats the aquifer properties and the available water level measurements as variable input parameters. The locations of wells, water levels, and the aquifer geometry were evaluated using information from the CWI database. For the solution, Oneka finds the flow field that best fits the network of water level elevations by varying the values of the aquifer thickness and transmissivity. Oneka then evaluates the probability of the capture of a given point based on the number of times it is included in the capture areas generated by the total number of solutions. The output from the model is a capture zone probability map for the specified time of travel (10 years).

The combined output from the Modflow and Oneka models were composited to create the city's WHPA (Figure 1). For the shallow aquifer, surface runoff was also considered as a possible source of focused recharge. This was determined by calculating surface vectors from a 1one-meter accurate

LIDAR elevation model and analyzing runoff flow direction that contributes to the modeled WHPA. These areas were then combined with the groundwater capture zones generated from Modflow and Oneka to create the WHPA for Well 13.

The stable isotope results show that city well water plots near the meteoric water line. This indicates either no or weak hydraulic connection between Prairie Lake and the city's aquifer. It is for this reason that a conjunctive delineation with Prairie Lake was not needed (Appendix A).

o Results of Model Calibration and Sensitivity Analysis

Model calibration is a procedure that compares the results of a model based on estimated input values to measured or known values. This procedure can be used to define model validity over a range of input values, or it helps determine the level of confidence with which model results may be used. As a matter of practice, groundwater flow models are usually calibrated using water elevation or flux. The sensitivity analysis quantifies the differences in model results produced by the natural variability of a particular parameter. Uncertainty analysis addresses the effects of poor data quality (lack of local detailed information or deficiencies in the data) on the model results. Together, sensitivity and uncertainty analyses are commonly used to evaluate the effects that natural variability and uncertainties in the hydrogeologic data have on the size and shape of the capture zones. In regards to the WHPA delineation, these analyses are used to document that the delineation is optimal, conservative, and protective of public health based on existing information.

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

Model Calibration

The city of Pelican Rapids model was calibrated to the CWI database water level targets. A qualitative evaluation of the calibration can be made by comparing the simulated potentiometric surface (Figures 2a and 2b) with the observed water level targets from the CWI database. Upon review the calibrated flow model generally captures the major features of the groundwater flow system along with the elevation, shape, magnitude, and gradient of the CWI database observed flow field.

A quantitative measure by which to evaluate the success obtained during calibration is to compare the root mean square of the residuals (RMSE) and the maximum observed head difference across the model. A usually accepted calibration target is a RMSE that represents less than 15 percent of the total head change across the modeled area (Barr Engineering Company, 2008). For the present calibration, the RMSE is 5.3 percent of the maximum observed head difference across the model. Another calibration technique is to compare base flow of rivers running through the model domain. Values for the Pelican River indicate a range of 13.7 cubic feet per second to 161 cubic feet per second (Wiche, 1997) compared to a simulated value of 130 cubic feet per second.

Sensitivity Analysis

Model sensitivity is the amount of change in model results caused by the variation of a particular input parameter. Because of the relative simplicity of the groundwater model, the direction and extent of the modeled capture zone may be very sensitive to any of the input parameters.

- **Pumping rate** directly affects the volume of the aquifer that contributes water to the well. An increase in pumping rate leads to an expanded capture zone, proportional to the porosity of the aquifer materials.

    - The pumping rate is based upon the results presented in Table 5 and was therefore not a variable factor that will influence the delineation of the WHPA.

- **Groundwater flow direction** determines the orientation of the capture zone. Variations in the direction of groundwater flow will not affect the size of the capture zone but are important for defining the areas that are contributing water to the well.

    - General flow direction was determined based upon static water levels of similarly screened wells in the area of the model. Due to a large uncertainty in CWI water levels in the deep aquifer and erring on the conservative side, two different versions of the model were created, each of which uses a different set of water level observation points. This resulted in two different distributions of hydraulic conductivity within Layer 3 in order to calibrate the model, which in turn resulted in two different sets of flow fields and resulting capture zones. These were composited to create the final WHPA for the city's deep aquifer wells. Oneka was also used to evaluate uncertainty in the flow direction and incorporate this uncertainty in the WHPA.

- **Hydraulic gradient** (along with aquifer transmissivity) determines the rate at which water moves through the aquifer materials.

    - The flow field shown in Figure 2a and 2b provides the basis for determining the extent to which each model run reflects the conceptual understanding of the orientation of the capture area for each well. The regional model has been calibrated to hydraulic heads. The sensitivity of the WHPA to the hydraulic gradient should not be significant given the current knowledge of the hydraulic head distribution in the aquifer

- **Hydraulic conductivity** influences the size and shape of the capture zone. A decrease in hydraulic conductivity decreases the length of the capture zone and increases the distance to the stagnation point, making the capture zone more circular in shape and centered on the well.

    - Initial hydraulic conductivity was calculated from specific capacity or aquifer tests conducted throughout the region and geostatistically smoothed across the model domain, with values near the city well field reflecting those obtained from the city wells. Two additional model runs were performed wherein the hydraulic conductivity was increased/decreased by 25 percent to account for the reduced values generally observed for this parameter away from the city well field and the uncertainty involved with the specific capacity assumptions. For the shallow unconfined aquifer this resulted in a capture zone that was 2% smaller and 4.7% larger than the initial calibrated case. For the deep confined aquifer this resulted in a capture zone that was <1% smaller and <1% larger than the initial calibrated case. A third model run was performed using the alternate deep aquifer flow field and the hydraulic conductivity value of the city wells was used distally to give a conservative capture area.

- **<u>Aquifer porosity</u>** influences the size and shape of the capture zone.
    - Decreasing the porosity causes a linear, proportional increase in the areal extent of the capture zone. A conservative literature value of 20 percent was used for the delineation and this value was not varied (Fetter, 2001).

- **<u>Aquifer thickness</u>** influences the size and shape of the capture zone.
    - Final aquifer thicknesses used in the Modflow model were the result of a multi-step statistical analysis. The three-dimensional aquifer top elevation was calculated by interpolating the aquifer top elevation between wells that were drilled into the city's aquifers. Because few wells were drilled through the entire aquifer, a statistical analysis of aquifer thickness was done to calculate an approximate thickness of the aquifer in any given area of the model domain. Where true aquifer thickness was known based on well logs, that value was used. In locations where the true thickness was unknown, the aquifer top elevation surface was then used to calculate the aquifer bottom elevation by subtracting the statistically-derived aquifer thickness for that grid from the grid's top elevation. Unrealistic values were identified and disposed of at all steps by comparing with adjacent well data, where available, and by hydrogeologic judgment. The result was a variable range of thicknesses in the shallow unconfined aquifer of 12 to 160 feet throughout the model extent, with a thickness of 135 feet within the city's well field, a variable range of thicknesses in the deep confined aquifer of 30 to 52 feet throughout the model extent, with a thickness of 46 feet within the city's well field and was not varied in the multiple model runs conducted.

o Addressing Model Uncertainty

There is always some uncertainty associated with the numerical simulation of groundwater, as using computer models to simulate groundwater flow involves representing a complicated natural system in a simplified manner. The model simulations present a non-unique solution. Local geologic conditions may vary within the capture area of the public water supply wells, but the amount of existing information that is needed to accurately define this degree of variability is often not available for portions of the WHPA. In addition, the current capabilities of groundwater flow models may not be sufficient to represent the natural flow system exactly. However, the results are valid within a range defined by the reasonable variation of input parameters for this delineation setting.

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

Pumping Rate - For each well, a maximum historical (five-year) pumping rate or an engineering estimate of future pumping, was used, whichever is greater (Minnesota Rules, part 4720.5510, subpart 4).

Hydraulic Conductivity – Layers 1 and 3 of the Modflow Model were adjusted plus and minus 25% as described above.

Groundwater Flow Field – Due to uncertainty in the groundwater flow direction in the deep aquifer, two different versions of the model were created, each of which uses a different set of water level observation points. This resulted in two different distributions of hydraulic conductivity within Layer 3 in order to calibrate the model, which in turn resulted in two different sets of flow fields and resulting capture zones. These were composited to create the final WHPA for the city's deep aquifer wells.

Probability Analysis - The Oneka Model was used to estimate capture zone probability.

Capture areas were developed for a range of hydraulic conductivities, and times of travel of one and of ten-years (Figure 6). As the Modflow Model code uses constant input values for each run, several runs were required to include all variations in input parameters. Table 7 documents the variables used to address uncertainty.

Table 7 – MODFLOW Model Parameters Used in Uncertainty Runs

File Name	Pelican Rapids City Discharge (m^3/day)	Model Domain Hydraulic Conductivity (m/day)	Area Proximal to City Wells Hydraulic conductivity (m/day)	Porosity (%)	Remarks
Calibrated Steady State	Shallow: 410.52 Deep: 1,667.7	Spatially variable: Shallow: 3-168 Deep: 1-60	Shallow: 50-130 Deep: 16.5-35	20	Calibrated Steady State Model used as base scenario
Conductivity-25 Percent	Shallow: 410.52 Deep: 1,667.7	Spatially variable: Shallow: 2.25-126 Deep: 0.75-45	Shallow: 37.5-97.5 Deep: 12.4-26.25	20	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 0.75
Conductivity+25 Percent	Shallow: 410.52 Deep: 1,667.7	Spatially variable: Shallow: 3.75-210 Deep: 1.25-75	Shallow: 62.5-162.5 Deep: 20.6-43.75	20	Calibrated Steady State Model with Kx, Ky and Kz multiplied by 1.25
Conservative WHPA	Shallow: 410.52 Deep: 1,667.7	Spatially variable: Shallow: 3-168 Deep: 1-60	Shallow: 50-130 Deep: 41-46	20	Calibrated Steady State Model based on alternate CWI head targets

For the Oneka Model, uncertainty related to water levels reported on well records is based on the accuracy of the ground elevation assigned to the well using topographic maps and the transient variability of the water levels in the aquifer over time. Water levels that are probably inaccurate were identified using data from the CWI database. Only water levels that fit the flow field (Figures 2a and 2b) were used for the Oneka analysis.

The Oneka Model helps to address uncertainties related to aquifer parameters as variations of the flow field. A 10-year capture zone probability map (Figure 6) was generated for the public water supply wells. The values used for the Oneka Model are shown in Table 8. The Oneka results fit well with the capture zones calculated by MODFLOW. The probability map for the public water supply wells shows that uncertainty of the capture zone increases as the distances from the public water supply wells increase (Figure 6).

Table 8 - Range of Values Used for the Oneka Model

Unique Number (Well Name)	File Name	Hydraulic Conductivity (meters/day)	Thickness (meters)	Porosity (%)
445082 (13)	Pelican Shallow	2.8 – 145.2	41	20
215513 (7), 215511 (8), 215512 (9), 753273 (15)	Pelican Deep	3.2 – 53.1	14.6	20

Delineation of the Drinking Water Supply Management Area

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

Center-lines of highways, streets, roads, or railroad rights-of-way

Public Land Survey coordinates

Parcel Property or fence lines

Vulnerability Assessments

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

o Assessment of Well Vulnerability

The vulnerability assessments for each well used by the city of Pelican Rapids are listed in **Table 1** and are based upon the following conditions:

1) Well construction at Wells 13 and 15 meets current State Well Code specifications (Minnesota Rules, part 4725); meaning that the well itself should not provide a pathway for contaminants to enter the aquifer used by the public water supplier. Wells 7, 8 and 9 do not conform to current standards because neither the outermost annular space nor the annular spaces between casings were grouted. These wells have the potential for acting as conduits for flow of near surface water and contaminants into the buried aquifer but to date, no evidence of this has been identified.
2) The geologic conditions at Well 13 in the water table aquifer do not include a laterally continuous cover of clay-rich geologic materials. Wells 7, 8, 9, and 15 include a cover of clay-rich geologic materials over the aquifer that is sufficient to retard or prevent the vertical movement of contaminants.
3) None of the human-caused contaminants regulated under the federal Safe Drinking Water Act have been detected at levels indicating that the well itself serves to draw contaminants into the aquifer as a result of pumping.

4) Water samples were collected from the city's wells at various dates and were analyzed for tritium, nitrate, chloride and bromide. Tritium has been detected in the shallow Well 13 along with a slightly elevated chloride/bromide ratio indicating post-1953 water and confirming its vulnerable status (Alexander and Alexander, 1989; Mullaney, et.al, 2009). In the deep city wells (7, 8, 9 and 15), no tritium or nitrate was detected in the samples, confirming the non-vulnerable nature of the wells (Alexander and Alexander, 1989). In addition, the chloride and bromide results confirm that the wells have not been impacted by land-use activities (**Table 9**).

Table 9 - Isotope and Water Quality Results (Various)

Unique Number (Well Name)	Tritium (TU)	Nitrate (mg/L)	Chloride/Bromide ratio	Chloride (mg/L)	Bromide (mg/L)
215511 (8)	<0.8 (10/6/14)	<0.5 (07/17/14)	73	2.18 (07/10/12)	0.03 (07/10/12)
215512 (9)		<0.5 (07/17/14)	55	1.65 (07/10/12)	0.03 (07/10/12)
215513 (7)		<0.5 (07/17/14)	99	3.94 (07/10/12)	0.04 (07/10/12)
445082 (13)	11.1 (10/6/14)	<0.5 (07/17/14)	330	9.91 (07/10/12)	0.03 (07/10/12)
753273 (15)	<0.8 (10/6/14)	<0.5 (10/06/14)	73	2.20 (10/06/14)	0.03 (10/06/14)

o Assessment of Drinking Water Supply Management Area Vulnerability

The vulnerability of the DWSMA was assessed in two ways. First, the vulnerability of the aquifers to vertical infiltration was determined within the groundwater capture areas for the city wells. This assessment was based upon the following information:

1) Water chemistry data from Well 13 indicates that the shallow aquifer contains water that has detectable levels of tritium and human-caused contamination. In contrast, deep wells 7, 8, 9 and 15 do not contain detectable levels of tritium or human-caused contamination. Isotopic data from Wells 13 and 15 plot on or near the meteoric water line, indicating that neither has received an appreciable amount of recharge from surface water bodies, such as lakes, that are likely to develop an evaporative isotopic signature.
2) Review of the geologic logs contained in the CWI database, geological maps, and reports indicate that the aquifers exhibit varying geologic sensitivity throughout the DWSMA. The shallow aquifer is characterized by geologic sensitivity ratings ranging from high to low (Figure 7), whereas the deep aquifer is exclusively low in geologic sensitivity.

Taken together, these data suggest that the groundwater capture area for the shallow aquifer is highly vulnerable, suggesting vertical times of travel for recharging surface water on the order of weeks to years (Geologic Sensitivity Project Workgroup, 1991). The groundwater capture area for the deep aquifer is considered low vulnerability because it is isolated from the direct vertical recharge of surface water by thick layers of clay-rich sediment as confirmed by the absence of tritium in the well water. Vertical times of travel for recharging surface water are expected to be on the order of decades to centuries (Geologic Sensitivity Project Workgroup, 1991).

Second, the vulnerability of the surface water contribution area (SWCA) was assessed. Because this area has the potential to deliver runoff to the groundwater capture zones for the shallow aquifer within very short periods of time (hours to days), it is also considered to be highly vulnerable. However, the high vulnerability within the SWCA is only relevant with respect to land uses that have the potential to generate contaminated runoff.

Taken together, these two assessments yield the picture presented in Figure 7. In this view, areas underlain by the groundwater capture areas for the shallow aquifer are identified as having high vulnerability to infiltrating surface water, whereas those areas where surface water runoff is the only consideration are assigned a SWCA potential of high. Outside of these areas, the DWSMA is considered to have low vulnerability because it is only representing the vulnerability of the deep aquifer. Note that land features such as parcels, road centerlines, and quarter sections were used to establish the boundaries between these areas to facilitate their management.

Recommendations

The following recommendations have been generated to inform the next amendment of the city of Pelican Rapids wellhead protection plan.

1) Well Locating: This delineation is based on very little well data. If wells are constructed within two-miles of the city or one-mile of the DWSMA, their locations should be verified.
2) Water Quality Monitoring: The standard assessment monitoring package should be analyzed during year six at the city's primary wells. It is likely that MDH will be able to provide sample bottles and cover analytical costs, but these responsibilities should be determined as the sampling date approaches. The city may need to collect the samples and ship them to MDH.
3) New Wells: If new city wells are being considered, installing them in the deeper aquifer will provide the city with natural protection against man-made contaminants at the land surface.
4) Well Inventory: For the purposes of the potential contaminant source inventory that will be generated in the second part of the city's WHP plan it will be important to inventory all wells that are completed to depths greater than 150 feet in the low vulnerability areas of the DWSMA and all wells in the high vulnerability area of the DWSMA.

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Figures

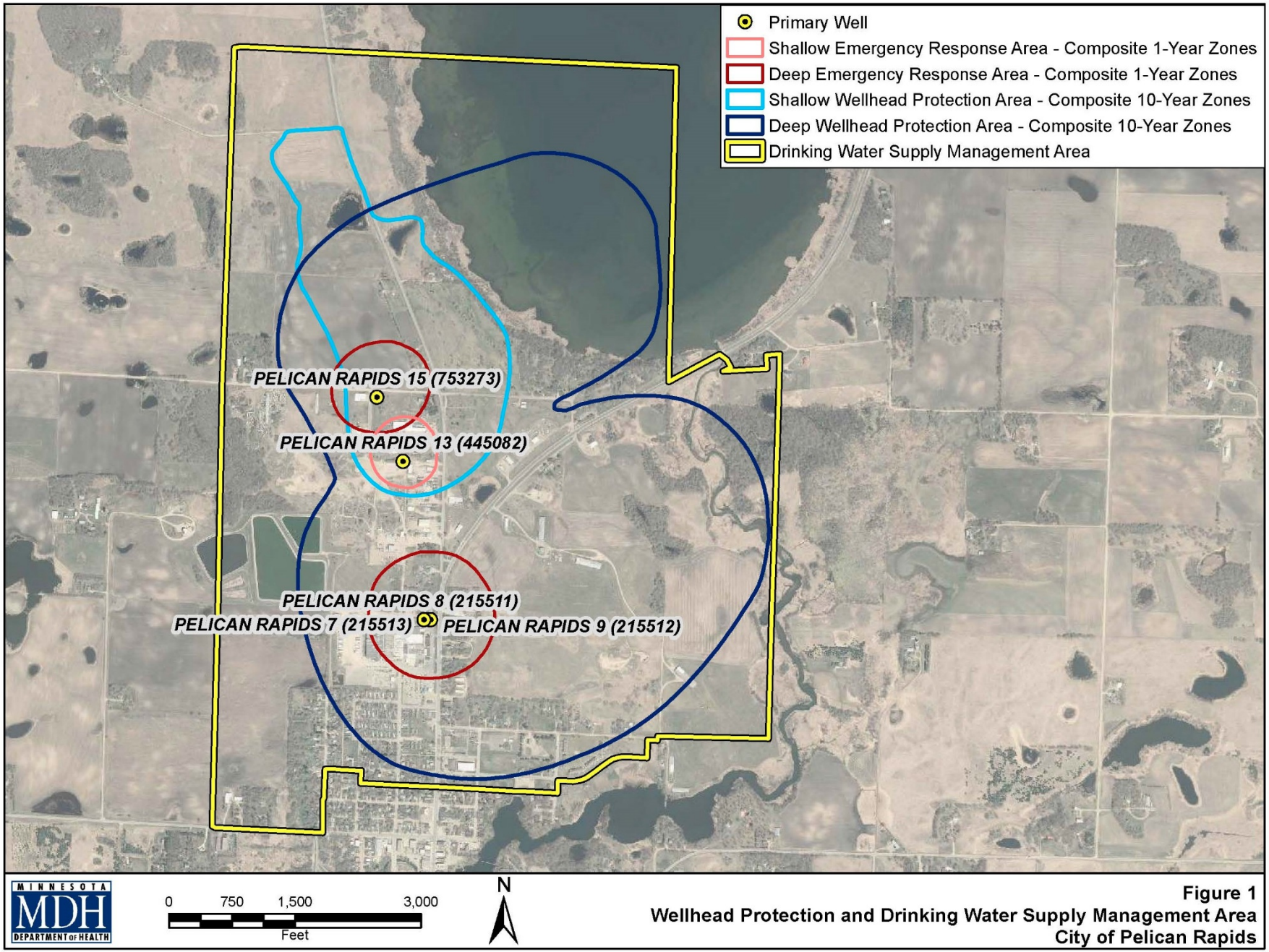
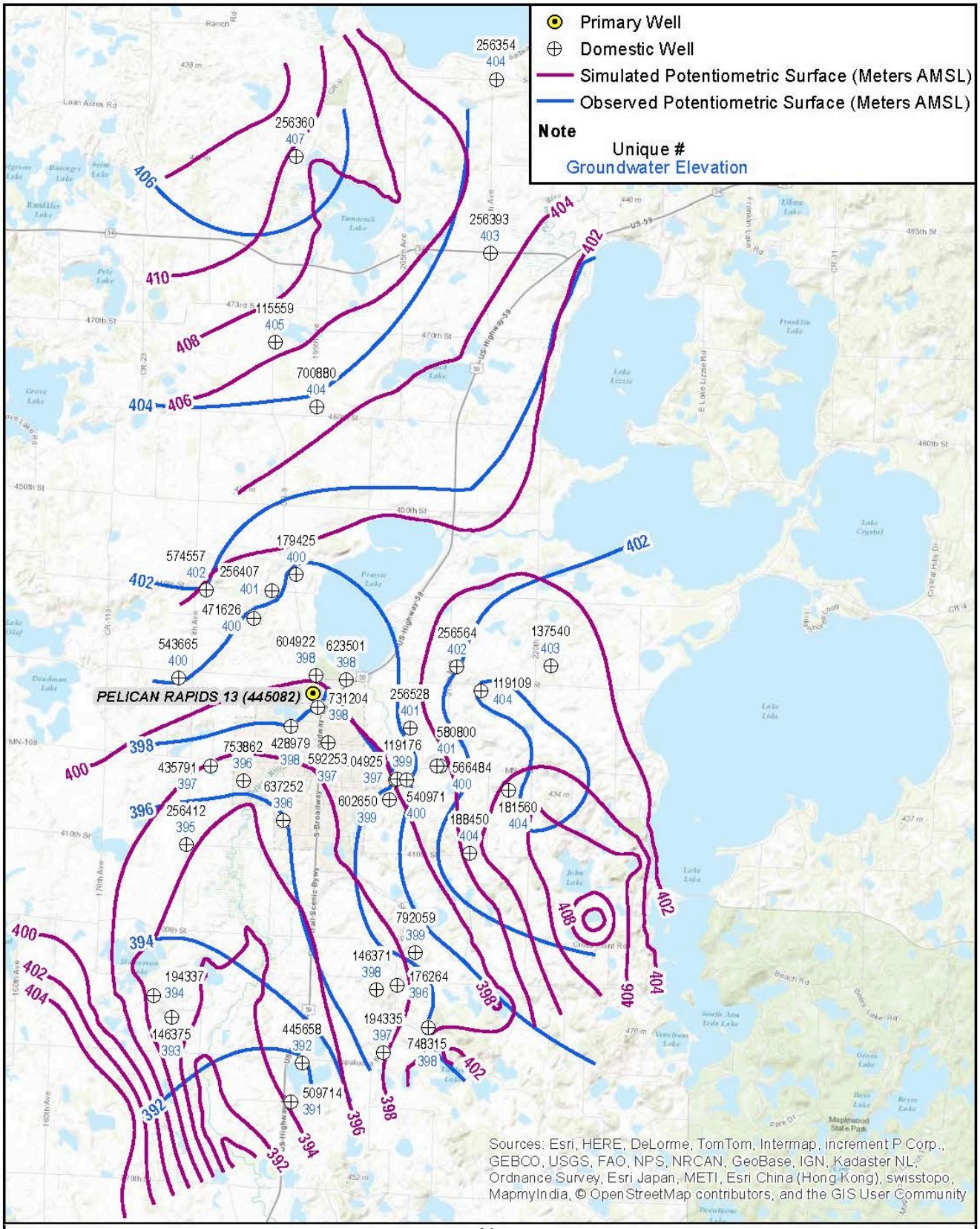


Figure 1
Wellhead Protection and Drinking Water Supply Management Area
City of Pelican Rapids

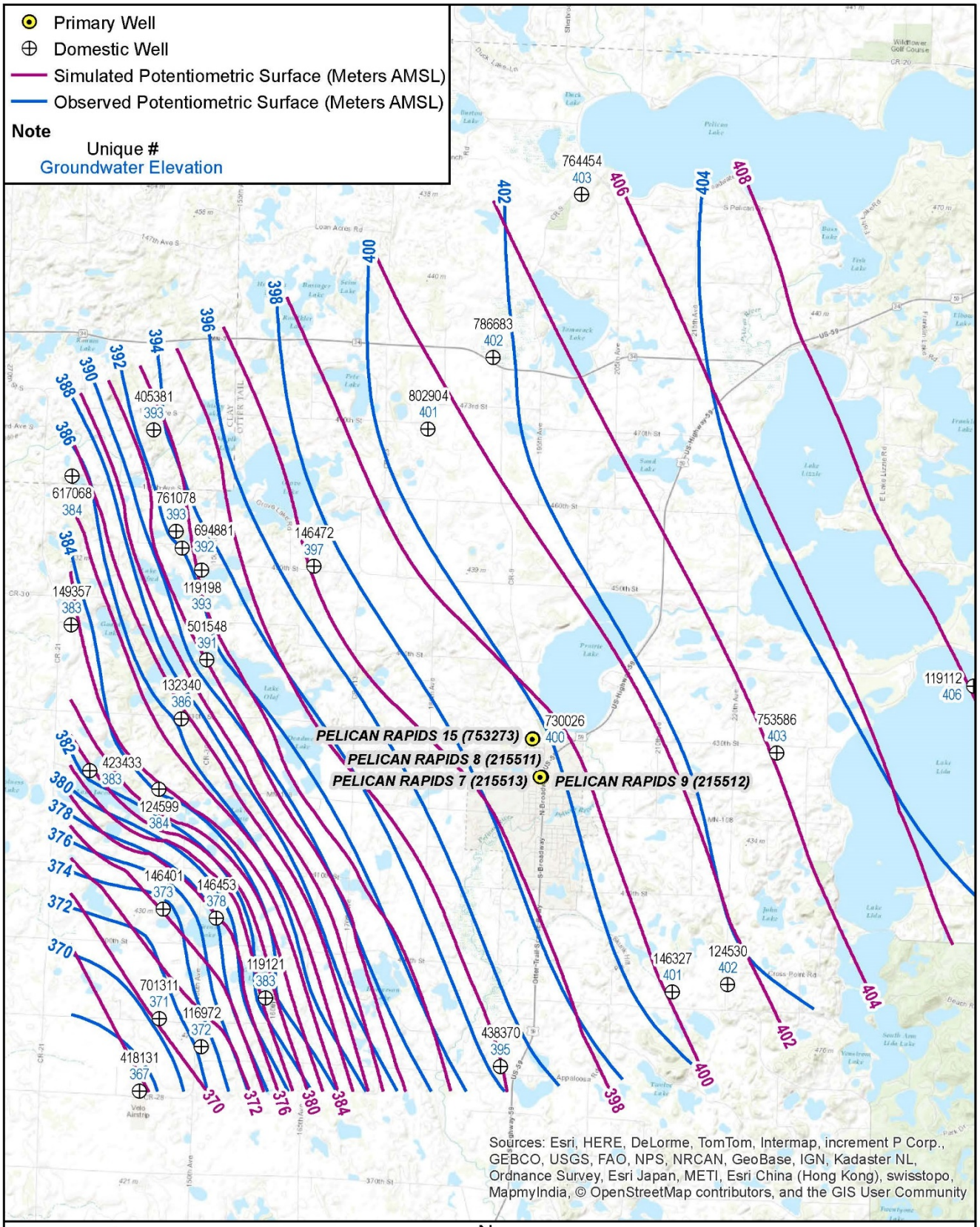


MINNESOTA MDH DEPARTMENT OF HEALTH

0 4,000 8,000 16,000
Feet

N

Figure 2a
Simulated and Observed Flow Field - Shallow Aquifer
City of Pelican Rapids



MINNESOTA MDH DEPARTMENT OF HEALTH

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N

Figure 2b
Simulated and Observed Flow Field - Deep Aquifer
City of Pelican Rapids

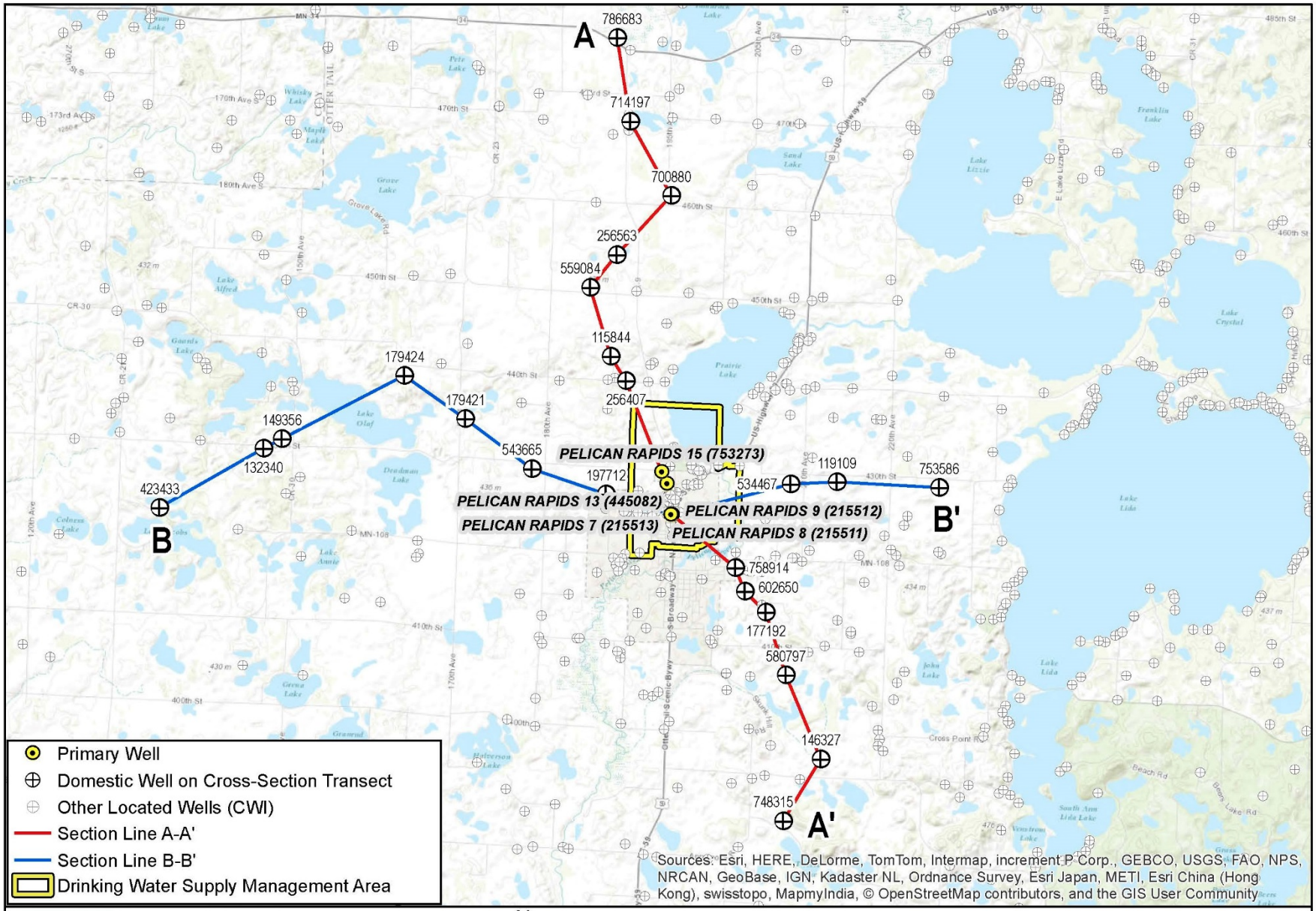


Figure 3
Geologic Cross-Section Locations
City of Pelican Rapids

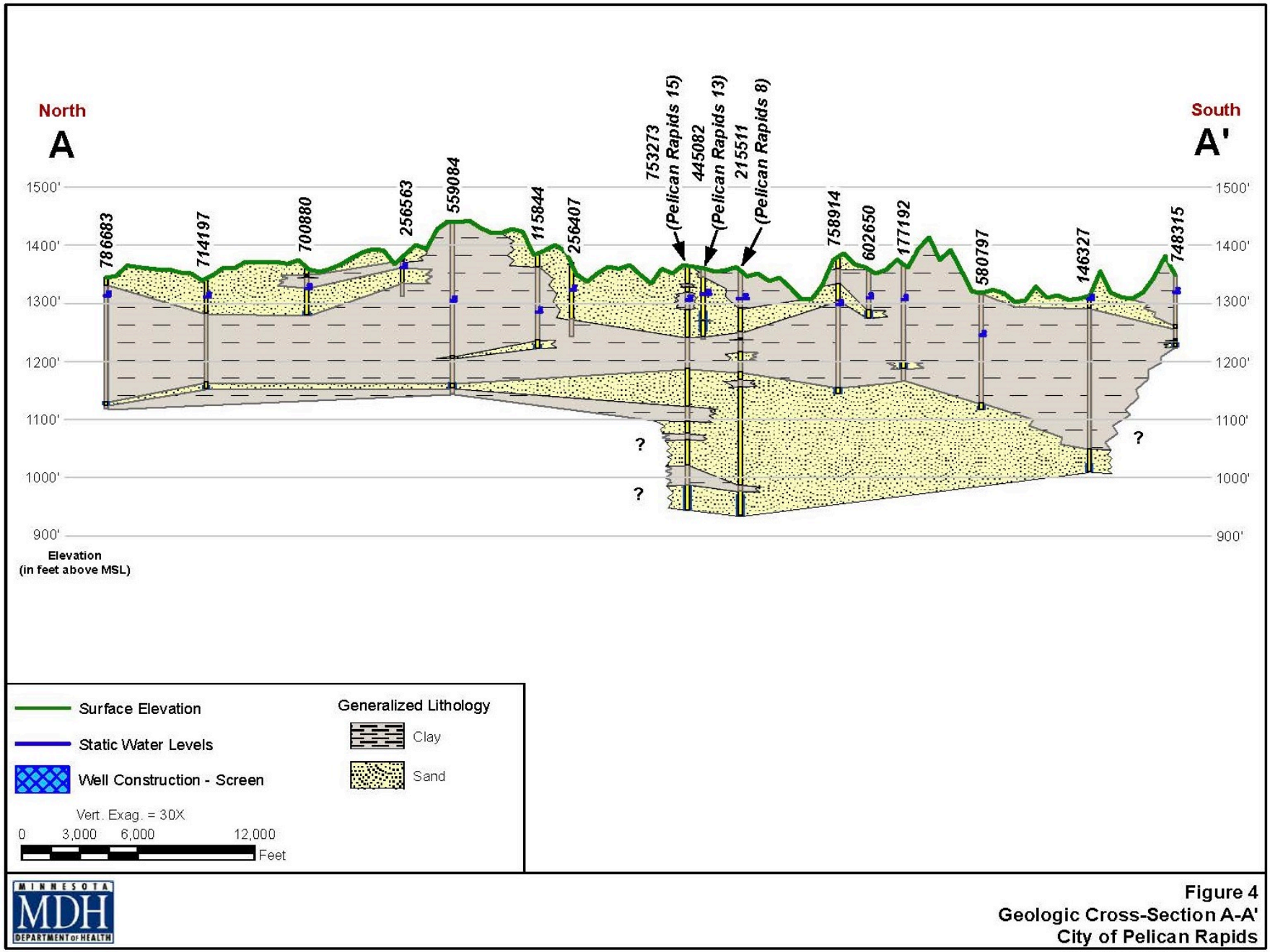


Figure 4
Geologic Cross-Section A-A'
City of Pelican Rapids

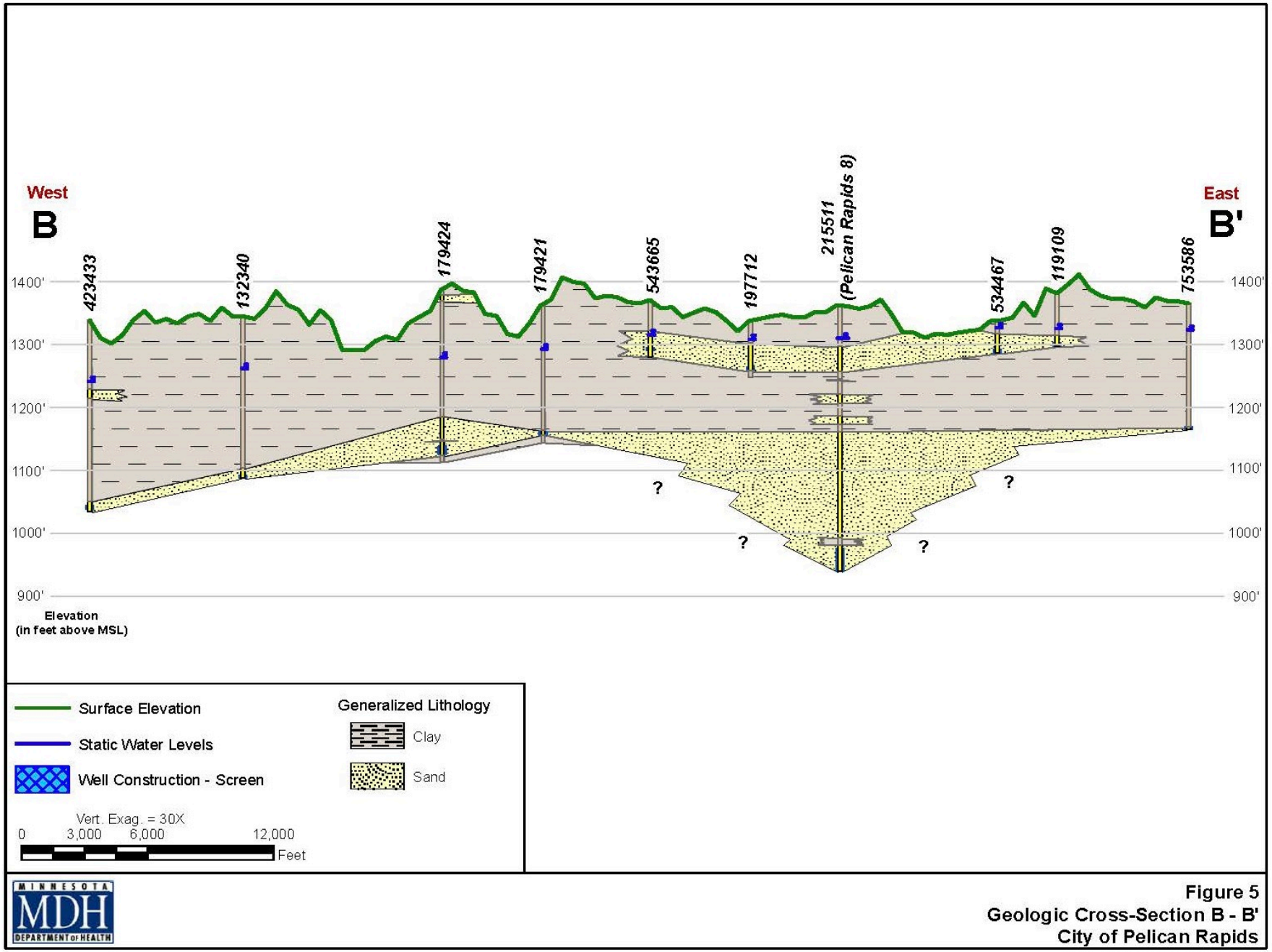


Figure 5
Geologic Cross-Section B - B'
City of Pelican Rapids

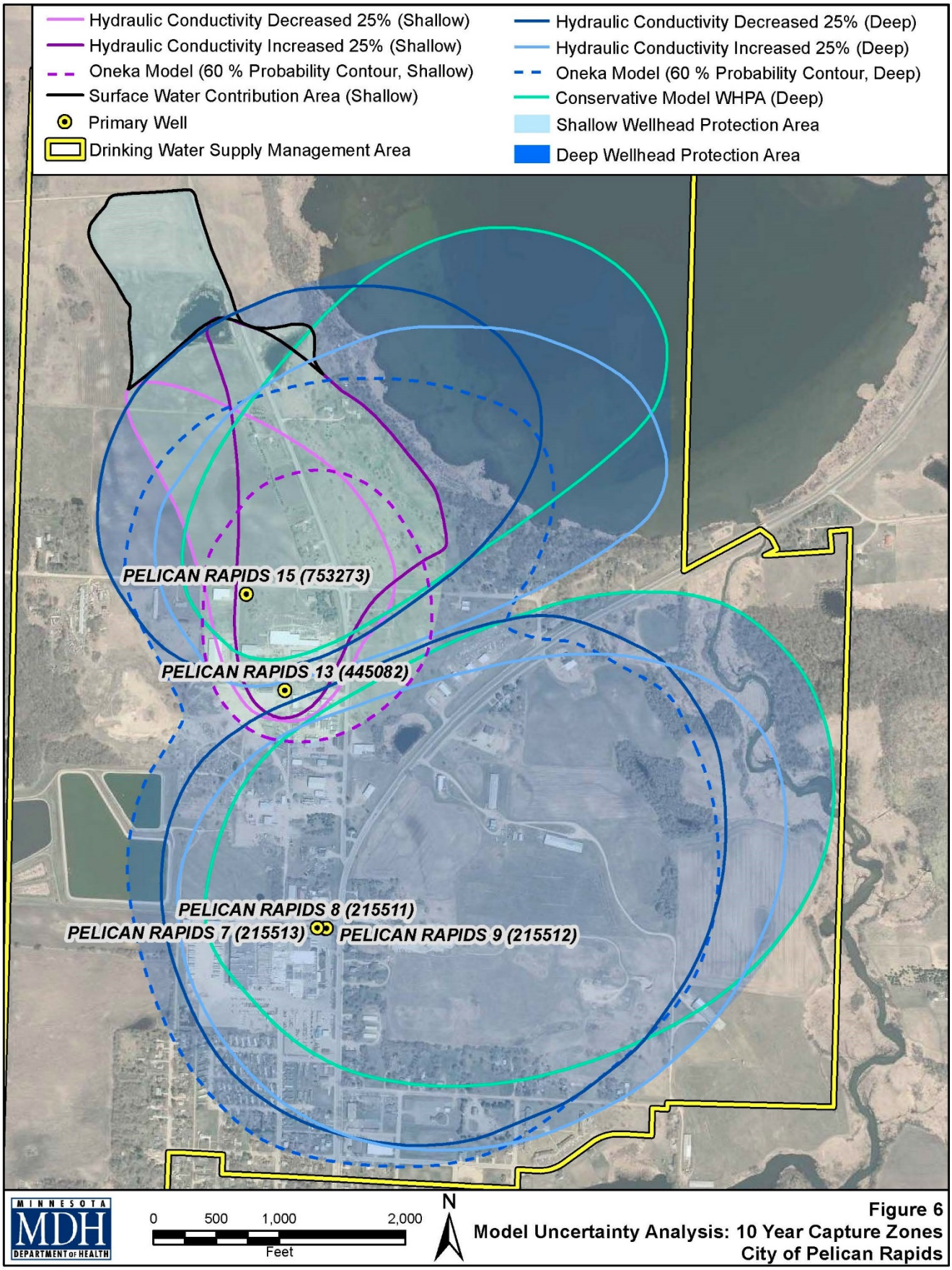
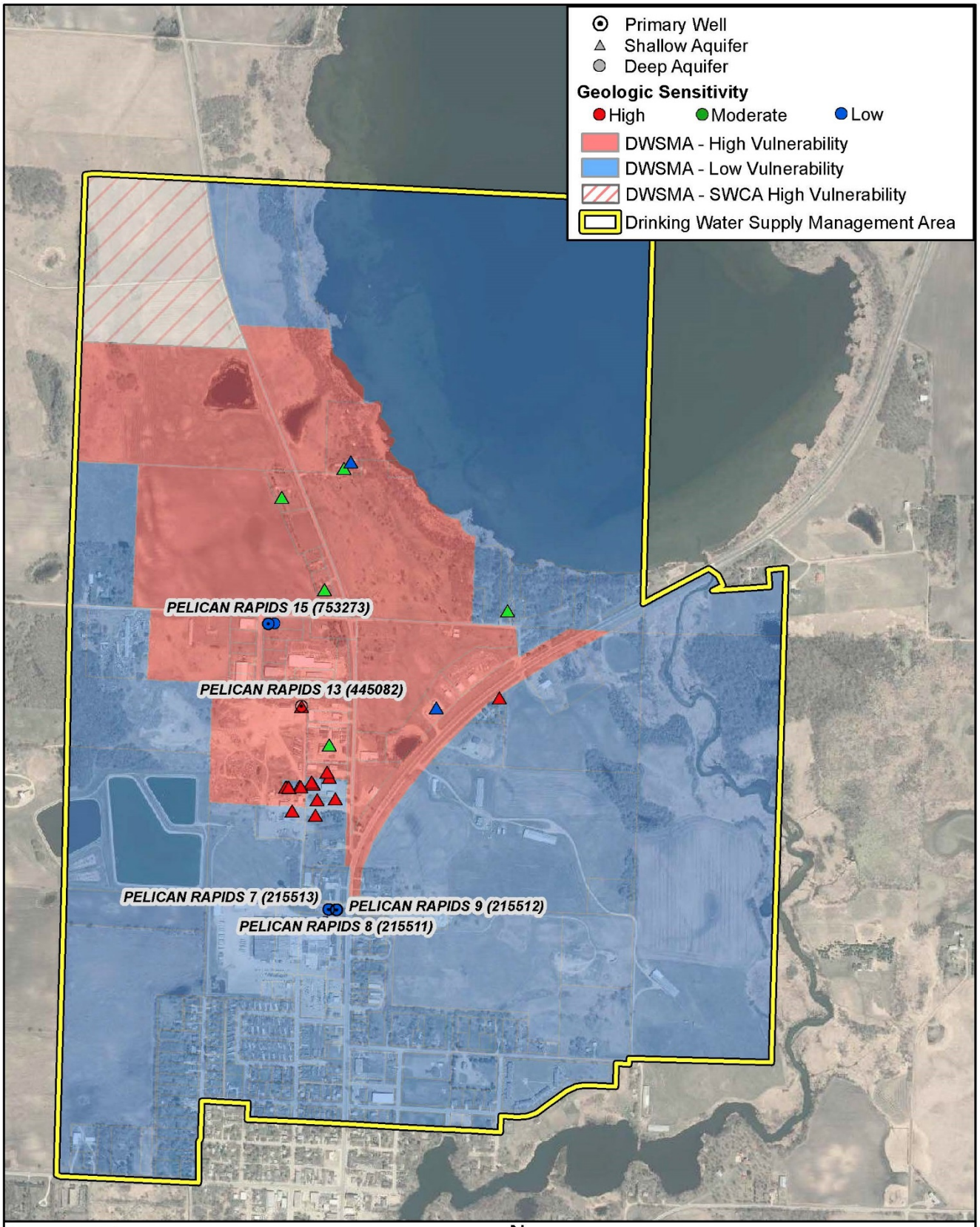


Figure 6
Model Uncertainty Analysis: 10 Year Capture Zones
City of Pelican Rapids



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Feet

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Figure 7
DWSMA Vulnerability
City of Pelican Rapids

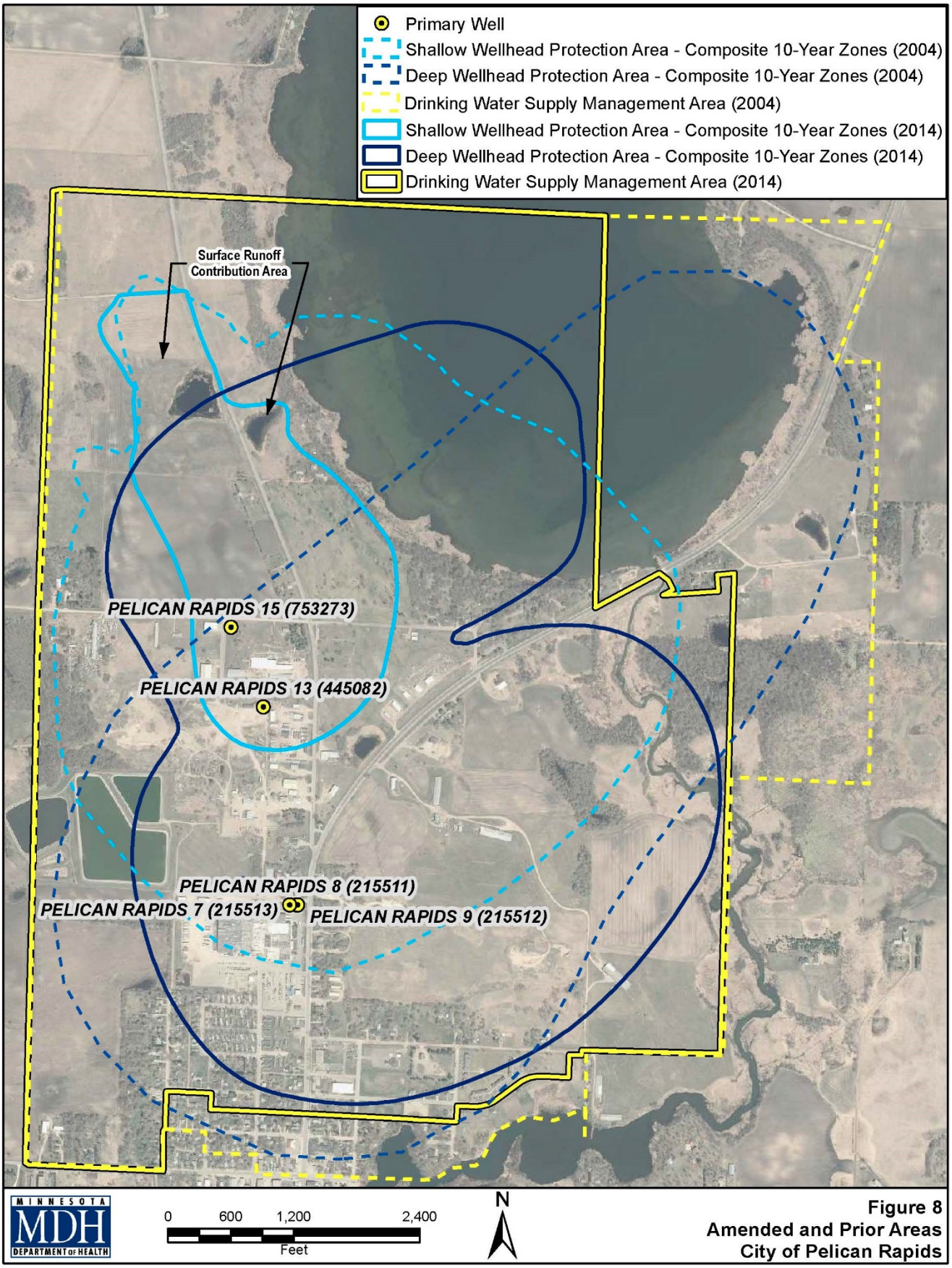
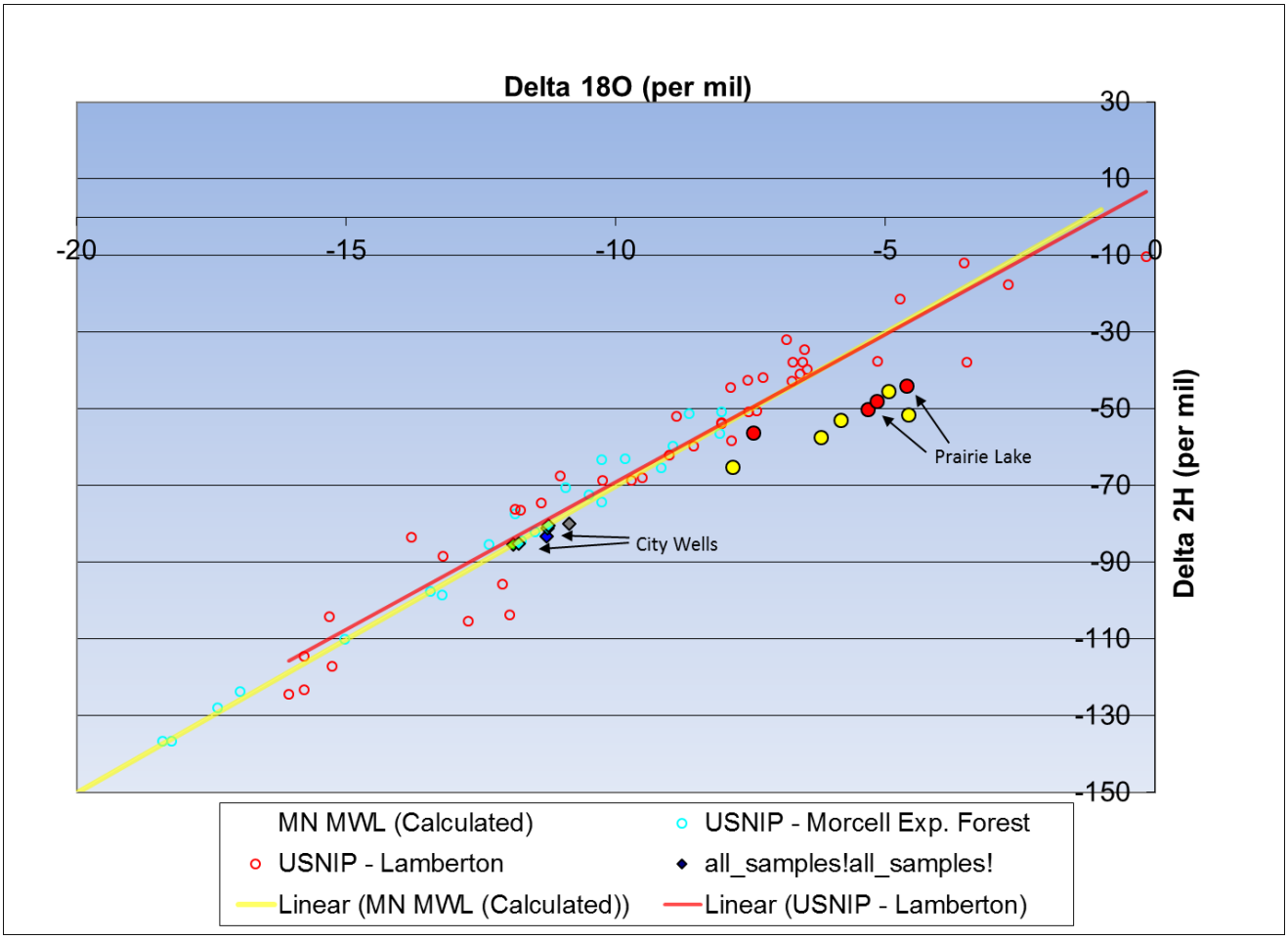


Figure 8
Amended and Prior Areas
City of Pelican Rapids

Appendix A

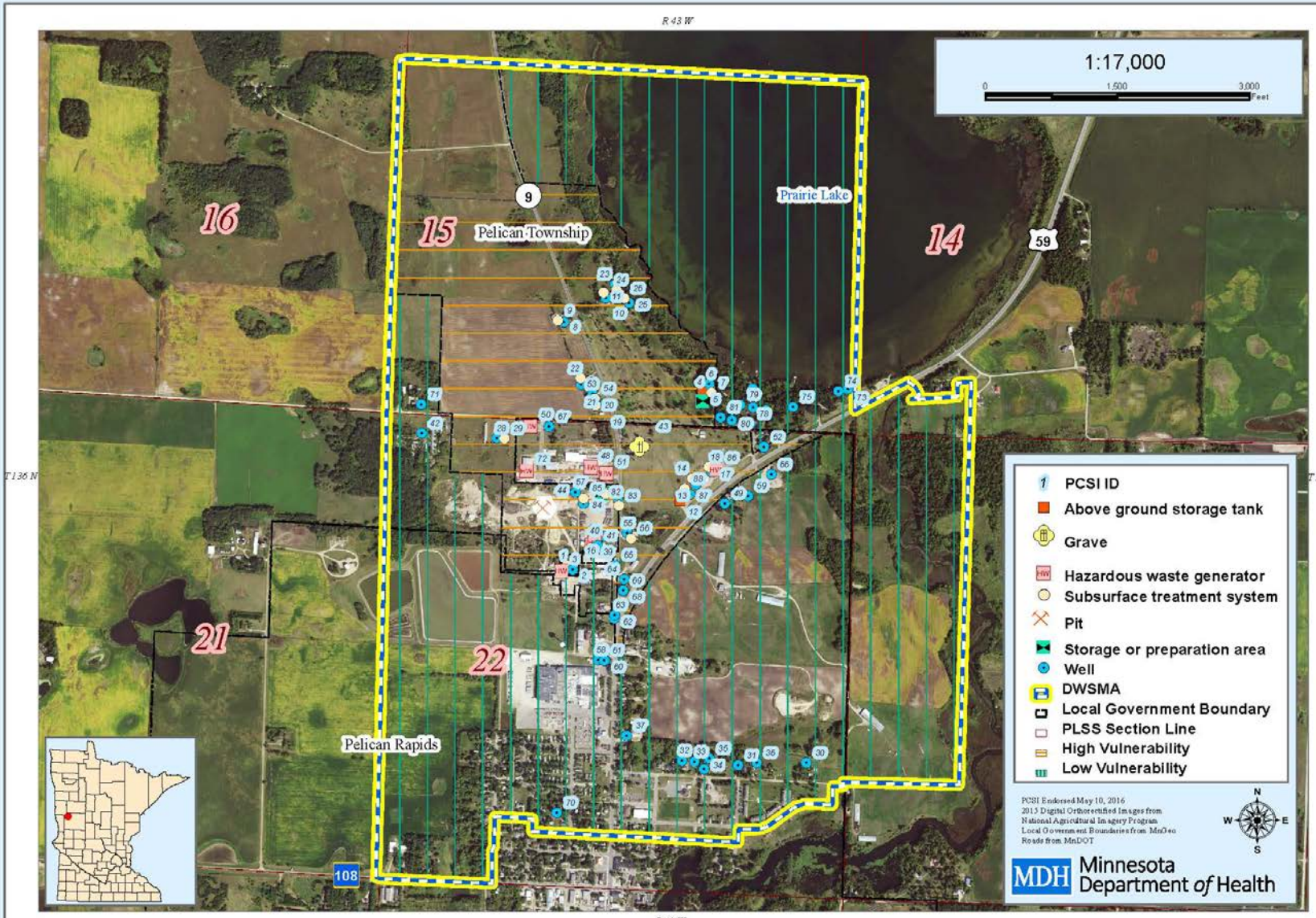

Delta 18O (per mil)
Delta 2H (per mil)
30
10
-10
-30
-50
-70
-90
-110
-130
-150
-20
-15
-10
-5
0
Prairie Lake
City Wells
MN MWL (Calculated)
USNIP - Morcell Exp. Forest
USNIP - Lamberton
all_samples!all_samples!
Linear (MN MWL (Calculated))
Linear (USNIP - Lamberton)

APPENDIX III –Potential Contaminant Source Inventory

Pelican Rapids
Otter Tail County
Minnesota

Pelican Rapids Drinking Water Supply Management Area (DWSMA)
MN-00792 - Potential Contaminant Source Inventory (PCSI)

Minnesota Department of Health
Environmental Health
Source Water Protection Unit



Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
1	500002201580	EGGE CONSTRUCTION	42665 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S03
2	500002201580	EGGE CONSTRUCTION	42666 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-	718762	1	MW-19D
3	500002201580	EGGE CONSTRUCTION	42667 County Highway 9	Pelican Rapids	56572	HWG - Hazardous waste generator	I - Inactive	-	2169761	1	
4	500001501190	BIRCHWOOD GOLF COURSE	19711 430th St.	Pelican Rapids	56572	AST - Aboveground storage tank	A - Active	-	16388	1	
5	500001501190	BIRCHWOOD GOLF COURSE	19711 430th St.	Pelican Rapids	56572	STOR - Storage or preparation area	A - Active	C010 - Agricultural chemical	25919	1	
6	500001501190	BIRCHWOOD GOLF COURSE	19711 430th St.	Pelican Rapids	56572	WEL - Well	A - Active	-	262810	1	
7	500001501190	BIRCHWOOD GOLF COURSE	19711 430th St.	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S04
8	500001501160	EGGE, STEVE	43243 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-	423434	1	

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
9	500001501160	EGGE, STEVE	43243 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S15
10	500001501140	MARTINSON, BRENDA	43262 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-	543042	1	
11	500001501140	MARTINSON, BRENDA	43262 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S31
12	760002200060	DEAN'S BULK SERVICE	1108 North Broadway	Pelican Rapids	56572	AST - Aboveground storage tank	A - Active	F000 - Fuels, gases & oils (unspecified)	20437	1	
13	760002200060	DEAN'S BULK SERVICE	1108 North Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-	589931	1	
14	760002200060	DEAN'S BULK SERVICE	1108 North Broadway	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S34
15	500002201580	VICTORY INDUSTRIES, INC.	42807 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-	611049	1	
16	500002201580	VICTORY INDUSTRIES, INC.	42807 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S37

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
17	760002200060	J & D RASMUSSEN PROPERTIES, LLP	1200 North Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-		1	W7
18	760002200060	J & D RASMUSSEN PROPERTIES, LLP	1200 North Broadway	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S07
19	500009903610	RORY JOHNSON	43033 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-		1	W40
20	500009903610	RORY JOHNSON	43033 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S40
21	500009903640	RICE, LARRY	43123 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-	796223	1	
22	500009903640	RICE, LARRY	43123 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S17
23	500001501140	HAGEN, DAVID E.	43256 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-	771056	1	
24	500001501140	HAGEN, DAVID E.	43256 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S18

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
25	500001501140	HAGEN, MARY	43260 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-	724449	1	
26	500001501140	HAGEN, MARY	43260 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S19
27	500001501170	JOHNSON, BRIAN	19793 430th Street	Pelican Rapids	56572	WEL - Well	A - Active	-		1	W20
28	500002201580	THOMPSON, ADELE	19428 430th Street	Pelican Rapids	56572	WEL - Well	A - Active	-		1	W23
29	500002201580	THOMPSON, ADELE	19428 430th Street	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S23
30	760002200240	LYNESS, JERELD	601 5TH AVE NE	Pelican Rapids	56572	WEL - Well	A - Active	-	727030	1	
31	760002200250	JOHNSON, BRADLEY & MARGARET	301 5TH AVE NE	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
32	760009906130	WAASDORP, GARY	129 5TH AVE NE	Pelican Rapids	56572	WEL - Well	A - Active	-		1	

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
33	760009906200	ROSILES, GUILLERMO & GLORIA	201 5TH AVE NE	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
34	760009906210	ABARCA, CARLOS	207 5TH AVE NE	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
35	760009906170	TORRES, ERNIE	516 3RD ST NE	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
36	760002200270	KLABOE, ROBERT	309 5TH AVE NE	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
37	760009906080	SAAVEDRA, RAMON & MARIA	605 North Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
38	500002201580	JIMS REPAIR	42723 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S37
39	500002201580	JIMS REPAIR	42723 County Highway 9	Pelican Rapids	56572	HWG - Hazardous waste generator	A - Active	-	96918	1	
40	500002201580	JIMS REPAIR	42723 County Highway 9	Pelican Rapids	56572	HWG - Hazardous waste generator	A - Active	-	MND9822050	1	

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
41	500002201580	JIMS REPAIR	42723 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-	562221	1	
42	500002201580	ROGER SCHLESKE	19132 430th Street	Pelican Rapids	56572	WEL - Well	A - Active	-		1	W24
43	760002200060	LAKE VIEW CEMETERY Association	430th Street and Co Hwy	Pelican Rapids	56572	GRV - Grave	A - Active	-	24417	1	
44	500002201580	DSE PROPERTIES	42665 County Highway 9	Pelican Rapids	56572	PIT - Pit	A - Active	-	67083	1	
45	500009903920	LUND MACHINE	42827 County Highway 9	Pelican Rapids	56572	STOR - Storage or preparation area	A - Active	C010 - Agricultural chemical	57078	1	
46	500009903920	LUND MACHINE	42827 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
47	500009903920	LUND MACHINE	42827 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	
48	760009908670	CHAMELEON COLORS INC.	5 INDUSTRIAL PARK DRIVE	Pelican Rapids	56572	HWG - Hazardous waste generator	A - Active	-	MND9856884	1	

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
49	760002200050	RAW, ED	1201 North Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-	714153	1	
50	760009908490	JOVANNY ZAVALA	44 Industrial Park Drive	Pelican Rapids	56572	HWG - Hazardous waste generator	A - Active	-	MNR0000307	1	
51	760009908660	ATTACHMENTS INTERNATIONAL	9 INDUSTRIAL PARK DRIVE	Pelican Rapids	56572	HWG - Hazardous waste generator	A - Active	-	ENF198	1	
52	760002200100	HILLSIDE MOTEL	1300 North Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-	136372	1	
53	500009903620	STADUM, JEFFREY	43077 Co Hwy 9	Pelican Rapids	56572	WEL - Well	A - Active	-	604922	1	
54	500009903620	STADUM, JEFFREY	43077 Co Hwy 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	S36
55	760002200060	BLACK MOUNTAIN INV LLC	1201 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-	262960	1	
56	760002200060	BLACK MOUNTAIN INV LLC	1201 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
57	500002201580	CITY OF PELICAN RAPIDS (EGGES LAND)	42665 CO HWY 9	Pelican Rapids	56572	WEL - Well	A - Active	-	445082	1	WELL #13
58	760002200130	CITY OF PELICAN RAPIDS	808 North Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-	215513	1	WELL #7
59	760002200050	NELSON, IRIS	1213 North Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-	518608	1	
60	760002200130	CITY OF PELICAN RAPIDS	808 North Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-	215512	1	WELL #9
61	760002200130	CITY OF PELICAN RAPIDS	808 North Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-	215511	1	City Well #8
62	ROW	MN DEPARTMENT OF TRANSPORTATION	CO HWY 9 & HWY 59	Pelican Rapids	56572	WEL - Well	A - Active	-	770873	1	MW-28D
63	ROW	MN DEPARTMENT OF TRANSPORTATION	CO HWY 9 & HWY 59	Pelican Rapids	56572	WEL - Well	A - Active	-	757959	1	MW-28i
64	ROW	MN DEPARTMENT OF TRANSPORTATION	CO HWY 9 & HWY 59	Pelican Rapids	56572	WEL - Well	A - Active	-	783457	1	MW-35S

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
65	ROW	OTTERTAIL COUNTY	1004 CO HWY 9	Pelican Rapids	56572	WEL - Well	A - Active	-	718760	1	MW-18S
66	760002200050	INNOVATIVE CONSTRUCTION	1309 N. Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-	740292	1	
67	760009908610	CITY OF PELICAN RAPIDS	29 INDUSTRIAL PK DR	Pelican Rapids	56572	WEL - Well	A - Active	-	753273	1	WELL #15
68	ROW	MN DEPARTMENT OF TRANSPORTATION	CO HWY 9 & HWY 59	Pelican Rapids	56572	WEL - Well	A - Active	-	718768	1	MW-20i
69	ROW	MN DEPARTMENT OF TRANSPORTATION	CO HWY 9 & HWY 59	Pelican Rapids	56572	WEL - Well	A - Active	-	718769	1	MW-20S
70	760002200230	MARTINEZ, ARNULFO & YOLANDA	109 3RD AVE NW	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
71	500001501160	DON & ANN SCHROEDER	19079 430th Street	Pelican Rapids	56572	WEL - Well	A - Active	-	801701	1	
72	760009908550	Environmental Control Systems Inc	22 Industrial Park Dr	Pelican Rapids	56572	HWG - Hazardous waste generator	A - Active	-	MNS0001291	1	

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
73	500001501180	ROESCH, EDWARD	43009 US Hwy 59	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
74	500001501180	LILLEBOE, DONALD	43005 US Hwy 59	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
75	500001501170	FITZSIMMONS, SEAN	19799 430th St	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
76	500001501170	NELSON, LEROY	19795 430th St	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
77	500001501170	JOHNSON, BRIAN & SHEILA	19793 430th St	Pelican Rapids	56573	WEL - Well	A - Active	-		1	
78	500001501170	HUGHES, STACY	19781 430th St	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
79	500001501170	SATTERLIE, ROBERT	19771 430th St	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
80	500001501190	ERICKSON, ROBERT	19751 430th St.	Pelican Rapids	56572	WEL - Well	A - Active	-		1	

Pelican Rapids DWSMA (MN-00792)

PCSI Report

ID	PIN	NAME	ADDRESS	CITY	ZIP	PCSI	STATUS	MATERIAL	PROGRAM ID	TOTAL	COMMENT
81	500001501190	EVENSON, CONNIE	19741 430th St	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
82	500009903930	NORTHWEST GLASS	42819 County Highway 9 N	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
83	500009903930	NORTHWEST GLASS	42819 County Highway 9 N	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	
84	500002201580	KENNY LYDEN CONSTRUCTION	42665 County Highway 9	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
85	500002201580	KENNY LYDEN CONSTRUCTION	42665 County Highway 9	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	
86	760002200060	J&D RASMUSSON PROPERTIES LLP	1200 N. Broadway	Pelican Rapids	56572	HWG - Hazardous waste generator	A - Active	-		1	
87	760002200060	DILLON ELECTRIC	1110 N. Broadway	Pelican Rapids	56572	WEL - Well	A - Active	-		1	
88	760002200060	DILLON ELECTRIC	1110 N. Broadway	Pelican Rapids	56572	SSTS - Subsurface sewage treatment system	A - Active	-		1	

Minnesota Department of Health
Environmental Health in Minnesota

MDH Public Water Supply Sources Report

PWSID: **1560019**
PWS Name: **Pelican Rapids**
PWS Type: **Community**
PWS Status: **Active**

Public Water Supply Sources: Information from MNDWIS and CWI (sorted by Sample Point ID)
Source Type Codes: **GW** = Ground water; **SW** = Surface water; **GUI** = Ground water under influence
Location Source: **MGS** = digitized by the MN Geological Survey; ***** indicates imcomplete records
O* = duplicate in Unverified Well Data; **R*** = duplicate in MNDWIS PWS Sources Removed from Flow; **S*** = duplicate in MNDWIS PWS Sources in Flow;

MNDWIS PWS SOURCES IN FLOW

Source Info							MNDWIS Data				CWI Data			
Sample Point ID	Name	Type	Availability	Status	Well No. (link to Well Log(s))	Location Info (link to Map)	Drill Year	Depth (in feet)	Case Depth (in feet)	Case Diam. (in inches)	Drill Date	Depth Completed (in feet)	Case Depth (in feet)	Case Diam. (in inches)
S05	**Well #7**	GW	Primary	Active	215513 O*	11/05/1999 (S. Pederson)	1961	420	388	**10**	00-00-1961	420.00	388.00	**4.00**
S06	**Well #8**	GW	Primary	Active	215511 O*	11/05/1999 (S. Pederson)	1964	422	387	6	06-17-1964	422.00	387.00	6.00
S07	**Well #9**	GW	Primary	Active	215512 O*	11/05/1999 (S. Pederson)	1964	422	387	12	08-07-1964	422.00	387.00	12.00
S08	**Well #10**	GW	Other	Inactive	241508 O*	10/04/2012 (R. Soule)	1970	123	88	12	00-00-1970	123.00		
S09	**Well #11**	GW	Other	Inactive	241509 O*	10/04/2012 (R. Soule)	1970	111	93	**8**	00-00-1970	111.00		**93.00**
S11	**Well #13**	GW	Primary	Active	445082	11/17/2003 (R. Soule)	1987	108	78	12	10-02-1987	108.00	78.00	12.00
S13	**Well #15**	GW	Primary	Active	753273	08/15/2014 (G. Nash)	2007	420	380		08-14-2007	420.00	380.00	12.00

MNDWIS PWS SOURCES REMOVED FROM FLOW

Source Info							MNDWIS Data				CWI Data			
Sample Point ID	Name	Type	Availability	Status	Well No. (link to Well Log(s))	Location Info (link to Map)	Drill Year	Depth (in feet)	Case Depth (in feet)	Case Diam. (in inches)	Drill Date	Depth Completed (in feet)	Case Depth (in feet)	Case Diam. (in inches)
S02	**Well #5A**	GW	Not in Use	Inactive	241506 O*	11/05/1999 (S. Pederson)	1957	132	112	24	00-00-1957	132.00	112.00	24.00
S04	**Well #6**	GW	Sealed	Inactive	221571 O*	01/01/1990 ( )	1960	110	89	0	05-01-1960	110.00	89.00	12.00
S10	**Well #12**	GW	Not in Use	Inactive	144068	11/17/2003 (R. Soule)	1979	**100**	**79**	**10**		**120.00**	**82.00**	**12.00**
S12	**Well #14**	GW	Not in Use	Inactive	629321	11/17/2003 (R. Soule)	2000	105	80	0	03-14-2000	105.00	80.00	12.00

MNDWIS and CWI data value discrepancies in preceding tables are shown in **RED** (0 or null values excepted).

Unverified Wells

The following tables show information on wells whose existence (or previous existence) has not yet been confirmed.

UNVERIFIED Well Data

Well Search Reference	Name(s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments

2

UNVERIFIED Well Data													
Well Search Reference	Name(s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments
A	Dug Well		20.0	20.0	20.0	60.0	Before 1926	Dug				N central part of village, outside pump stn.	Ref.: 1926 MDH Sanitary Rpt. In 5 ft. deep pump rm.
B	Dug Well		30.0	30.0	30.0	144.0	1933	Dug				N central part of village.	Ref.: 1934 MDH San. Rpt.
C	Well No. 1; Gravel-packed Well	228922	92.0	92.0	70.0	12.0	Before 1937	Cable Tool/Bored				In pump house SW part of village. Lot 5, Blk. 10, Blybergs Addn. 1937 MDH Rpt gives 90' depth/12-in. csg. 1949 MGS doc. gives 92' depth/8-in. casing. Reconstructed?	Ref.: 1937 MDH San. Rpt. Possibly H12879 Seal. Rec'd. Can city determine?
D	Well No. 2; H228883	228923	111.0	111.0	87.0	10.0	1952	Cable Tool/Bored		Y	2010	On tract 125' x 75', 141' N of the NE corner of Lot 1, Blk. 1 of Harris Addn.	Ref.: 1953 MDH San. Rpt. H228883.
E	Well No. 3	221570	75.0	75.0	55.0	16.0	1955	Cable Tool/Bored				136-43-17 SE/SE/NW	Ref.: 1956 MDH San. Rpt. DNR Ob well.
F	Well No. 4	221568	119.0	119.0	114.0	12.0	1956	Cable Tool/Bored				136-43-22 CAADBA	Ref.: 1956 MDH San. Rpt.
G	Well No. 5A; H288884	241506 R*	132.0	132.0	112.0	24.0	1957	Cable Tool/Bored		Y	2010		Ref.: 1957 MDH San. Rpt. H288884.
H	Well No. 5B	241507	112.0	112.0	90.0	8.0		Cable Tool/Bored					Ref.: MGS City Well files.
I	Well No. 6	221571 R*	129.0	129.0	109.0	12.0		Cable Tool/Bored					Ref.: MGS City Well files.
J	Well No. 7	215513 S*	420.0	420.0	388.0	10.0							Ref.: MGS City Well files: 447' deep, 415' of 10" csg. Well Record has confusing casing description that does not match descr. of csg. in MGS City Well files. Same

2

3

UNVERIFIED Well Data													
Well Search Reference	Name(s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments
													well?
K	Well No. 8	215511 S*	421.0	421.0	186.0	6.0							Ref.: MGS City Well files.
L	Well No. 9	215512 S*	422.0	422.0	385.0	12.0							Ref.: MGS City Well files.
M	Well No. 10; H288885	241508 S*	107.0	107.0	89.0	12.0	1970			Y	2010		Ref.: MGS City Well files. H288885.
N	Well No. 11; H288886	241509 S*	115.0	115.0	94.0	8.0		Cable Tool/Bored		Y	2010		Ref.: MGS City Well files. H288886.
O	Well No. 12; H288887, 144068	241510	100.0	100.0	79.0	10.0	1979			Y	2010		Ref.: 1979 MDH San. Rpt. Well No. 12 has two Unique ID no's: 144068 & 241510. Can city explain?
P	Pilot Hole					4.0						300 ft. S of Well No. 8	Ref.: Mentioned on DNR's Well Log Statement for Well No. 6.
Q	Test Well											"Approx. 600' from turkey plant lagoon"	Ref.: 1975 MDH Rpt.
R	Test Well No. 1	409623	130.0	130.0	74.0	2.0	1987	Rotary/Drilled					Ref.: 1998-2002 MDH OMW Inventory, 1Suite. Handwritten note: "was abandoned to state code".
S	Test Well No. 2	409624	160.0	160.0	84.0	6.0		Rotary/Drilled					Ref.: 1998-2002 MDH OMW Inventory, 1Suite. Handwritten note: "was abandoned to state code".

Databases Searched	Remarks
County Well Index (1-mile radius); MDH DWP Microfiche; MDH 1988-2002 Muni Well Inventory (1Suite); Lakesnwoods.com; Biennial Report of the MN State Dairy and Food Commissioner-1907; Minnesota Geological	Pelican Rapids is in Otter Tail County. This Unverified Municipal Well Inventory is as complete and thorough as possible, given available documentation. However, MDH Planners and Hydrologists, as well as City representatives should feel free to add or subtract from this report as necessary. PELICAN RAPIDS, a city in sections 21, 22, 27, and 28 of Pelican Twp., was platted in 1872 and incorporated 1883. The 1922 MDH rpt. mentions two private wells: a 250'

3

4

UNVERIFIED Well Data													
Well Search Reference	Name(s)	Unique Well Number	Drilled Depth (ft.)	Completed Depth (ft.)	Depth Cased (ft.)	Casing Diameter (in.)	Year Constructed	Construction Type	Year Out of Service	Sealing Record?	Year Sealed	Location Info	Comments
Survey City Well File Folders; MGS Bulletin (22, 27, 31, or 32); MN Historical Society-Collections Online and/or Minnesota Reflections online; MNBrew.com or oldbreweries.com; MDH DWP MNDWIS; Past and Present MN Railroad Stations; MN Historical Soc.- Fire Underwriters Insp. Bureau (Fisher) historical map ; MDH WELLS					well (247032) at the prop'y of Mr. O.M. Carr in Blk. 3 of Farzee's 3rd Addn. and the 18' Mathison well near the Mill Pond dam. The 1947 and 1949 MDH Rpts mention inter-connections to a milk plant and a poultry plant, respectively. It is therefore likely that there wells at these facilities. Can the city investigate and determine locations for the potential wells and if they were sealed properly? The Pelican Rapids creamery reportedly operated in town in 1907. A well is possible at a creamery. Reportedly, there were no breweries in town. A station and possible round house of the Great Northern Railway was located here. The presence of a RR well is a distinct possibility because the line terminated here. A remark on the Well Record for Well No. 8 mentioned "Test Hole No. 2". Was there such a Test Hole near Well No. 8? If so, locate and make sure it is sealed. There appear to be two (2) Well No. 12's: 144068 & 241510. See records included in this report. Can city determine what happened? City monitoring wells are not PWS wells and as such are not on the Unverified Well list. However, sealing these monitoring wells is still required. The status of the following wells should be determined: 730026, 757960, & 770875. Other city monitoring wells may exist. The attached 1991 Sealing Record H12877 for a 62 ft., 2-in. well could not be associated with a known well. Can the city help? Similarly, the attached 1991 Sealing Records H12878, H12879, & H12880 and 1993 Sealing Record H30146 are not associated with known city wells. Can the city assist to determine which wells were sealed by these records? Two possibly private wells are shown north of the West Central turkey plant on the 1959 Fisher Map. Can the city associate them with known wells or might these wells belong to the city? Two city wells are shown on the 1959 Fisher historical maps. Can the city associate them with the known wells on this list? If not, the two wells shown on the 1959 map should be added to the list of unverified PWS wells, located, and sealed appropriately. It should be determined whether or not R & S (Test Wells 1 & 2) were sealed according to current MDH regulations. The 1959 Fisher maps presented in this report are filed electronically and are saved separately. It appears that several PWS wells need to be located and sealed.							
Unverified Well Data Compiled By: **Geoffery Nash** Compiled Date: **10/20/2014**													

Source: MN Dep't. of Health - 10/23/2014

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Use of MDH Public Water Supply Sources Report

The report you have received shows three classes of Public Water Supply wells:

- In Use (actively used)
- Removed From Flow (for back-up or emergency use; may be disconnected from PWS)
- **Unverified Wells (unused wells with no documented location, unique ID number, and/or well sealing record)**

Unverified wells are unsealed, abandoned wells. These wells pose a risk of contamination to existing wells and aquifers. According to State Well Code and under the terms of your Wellhead Protection Plan, your PWS may need to identify, locate, and properly seal Unverified Wells within your Drinking Water Supply Management Area, to current MDH standards. While historical records may indicate that some of these wells were "capped", "abandoned", or "sealed" in the past, unless it can be shown that the sealing was performed to current standards, they may need to be located, cleaned out, and sealed properly with a well sealing record issued.

The report lists database references that were searched to compile the report. Under "Remarks" are notes and questions to help you with this process. State grant funding is available to help fund sealing of these old public water supply wells.

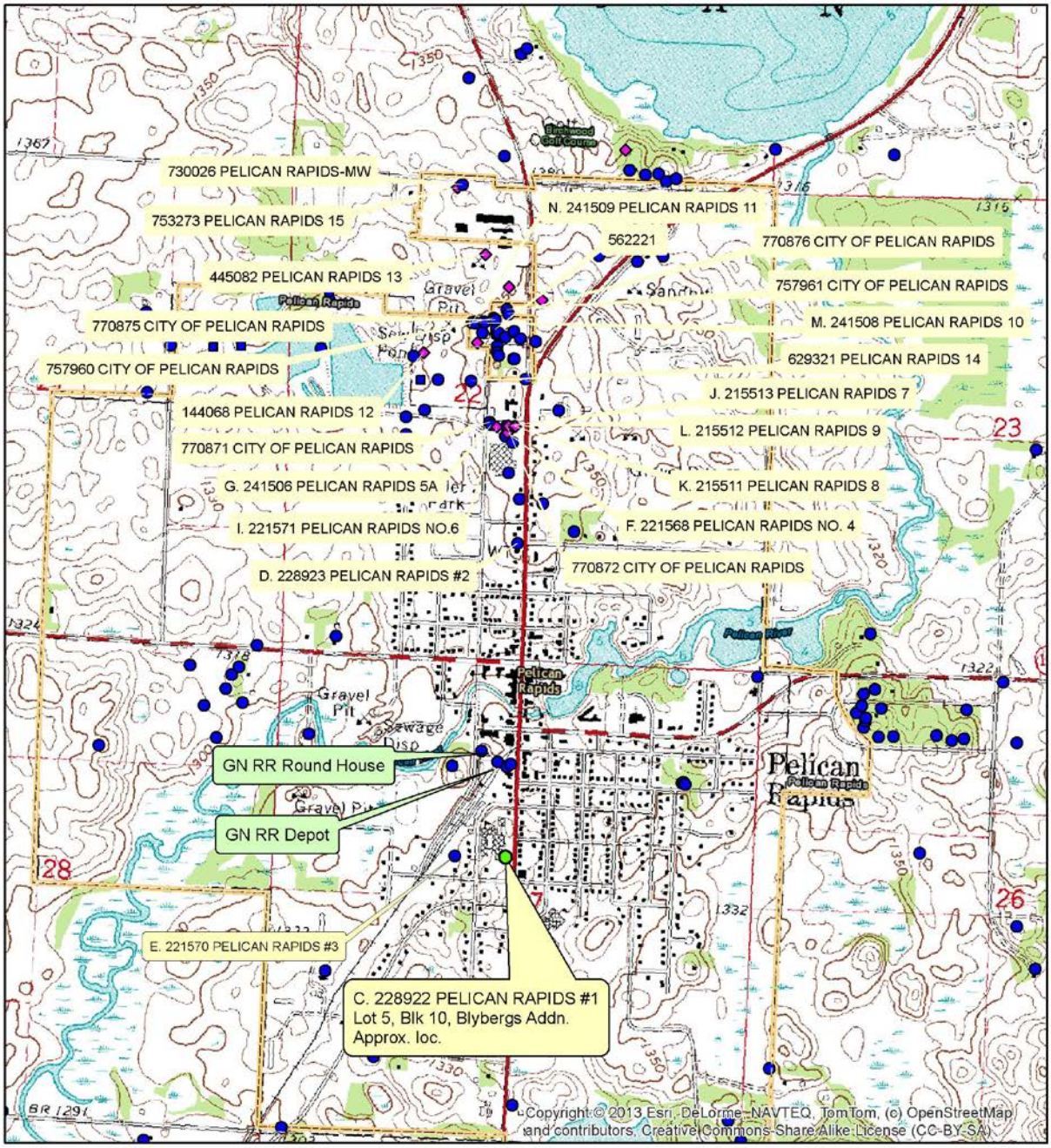
If you have questions, please talk to your MDH Planner or Hydrologist to address your PWS's specific issues. This report is not intended to be the "last word" on the status of unverified wells and your input will be critical in successfully finding and sealing these potential sources of contamination.

Restart

PWS Remarks in MDH Unverified Wells Report-10/23/2014
Pelican Rapids, Minnesota

Pelican Rapids is in Otter Tail County. This Unverified Municipal Well Inventory is as complete and thorough as possible, given available documentation. However, MDH Planners and Hydrologists, as well as City representatives should feel free to add or subtract from this report as necessary.

1. PELICAN RAPIDS, a city in sections 21, 22, 27, and 28 of Pelican Twp., was platted in 1872 and incorporated 1883.
2. The 1922 MDH rpt. mentions two private wells: a 250' well (247032) at the prop'y of Mr. O.M. Carr in Blk. 3 of Farzee's 3rd Addn. and the 18' Mathison well near the Mill Pond dam.
3. The 1947 and 1949 MDH Rpts mention inter-connections to a milk plant and a poultry plant, respectively. It is therefore likely that there wells at these facilities. Can the city investigate and determine locations for the potential wells and if they were sealed properly?
4. The Pelican Rapids creamery reportedly operated in town in 1907. A well is possible at a creamery.
5. Reportedly, there were no breweries in town.
6. A station and possible round house of the Great Northern Railway was located here. The presence of a RR well is a distinct possibility because the line terminated here.
7. A remark on the Well Record for Well No. 8 mentioned "Test Hole No. 2". Was there such a Test Hole near Well No. 8? If so, locate and make sure it is sealed.
8. There appear to be two (2) Well No. 12's: 144068 & 241510. See records included in this report. Can city determine what happened?
9. City monitoring wells are not PWS wells and as such are not on the Unverified Well list. However, sealing these monitoring wells is still required.
10. The status of the following wells should be determined: 730026, 757960, & 770875. Other city monitoring wells may exist.
11. The attached 1991 Sealing Record H12877 for a 62 ft., 2-in. well could not be associated with a known well. Can the city help?
12. Similarly, the attached 1991 Sealing Records H12878, H12879, & H12880 and 1993 Sealing Record H30146 are not associated with known city wells. Can the city assist to determine which wells were sealed by these records?
13. Two possibly private wells are shown north of the West Central turkey plant on the 1959 Fisher Map. Can the city associate them with known wells or might these wells belong to the city?
14. Two city wells are shown on the 1959 Fisher historical maps. Can the city associate them with the known wells on this list? If not, the two wells shown on the 1959 map should be added to the list of unverified PWS wells, located, and sealed appropriately.
15. It should be determined whether or not R & S (Test Wells 1 & 2) were sealed according to current MDH regulations.
16. The attached MGS City Well files reference two dug wells "about 25' deep and 5' diameter". Other references cite dug wells 20' deep, 5' diameter and a 30' deep, 12' diameter well. This could just be a misunderstanding or could indicate another 5' diameter dug well. Can the city determine if there is there a third dug well?
17. The 1959 Fisher maps presented in this report are filed electronically and are saved separately.
18. It appears that several PWS wells need to be located and sealed.


730026 PELICAN RAPIDS-MW
753273 PELICAN RAPIDS 15
N. 241509 PELICAN RAPIDS 11
562221
770876 CITY OF PELICAN RAPIDS
445082 PELICAN RAPIDS 13
757961 CITY OF PELICAN RAPIDS
770875 CITY OF PELICAN RAPIDS
M. 241508 PELICAN RAPIDS 10
757960 CITY OF PELICAN RAPIDS
629321 PELICAN RAPIDS 14
J. 215513 PELICAN RAPIDS 7
144068 PELICAN RAPIDS 12
L. 215512 PELICAN RAPIDS 9
770871 CITY OF PELICAN RAPIDS
G. 241506 PELICAN RAPIDS 5A
K. 215511 PELICAN RAPIDS 8
I. 221571 PELICAN RAPIDS NO.6
F. 221568 PELICAN RAPIDS NO. 4
D. 228923 PELICAN RAPIDS #2
770872 CITY OF PELICAN RAPIDS
GN RR Round House
GN RR Depot
E. 221570 PELICAN RAPIDS #3
C. 228922 PELICAN RAPIDS #1
Lot 5, Blk 10, Blybergs Addn.
Approx. loc.
Pelican Rapids
Gravel Pit
Sewage Disp
Pelican River
Bushwood Golf Course
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Appendix IV Contingency Strategy

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
FERGUS FALLS OFFICE

MNDNR

April 23, 2015

Brent E. Frazier, Utilities Superintendent
City of Pelican Rapids
Box 350
Pelican Rapids, MN 56572

Dear Mr. Frazier:

WATER SUPPLY PLAN APPROVAL, CITY OF PELICAN RAPIDS, OTTER TAIL COUNTY

In reviewing our records it appears we did not notify you of our review and approval of the City of Perham's revised Water Supply Plan submitted in 2011. DNR initially reviewed the Water Supply Plan for the City of Pelican Rapids in 2008 and suggested revisions which were generally incorporated into the revised plan received in 2011. The revised plan was found to be consistent with Minnesota Statutes, section 103G.291, subdivision 3, relevant at the time of submission, and is therefore approved.

Since that time there have been some changes in Minnesota Statutes relative to water supply planning. It is my understanding that the City is currently revising the Water Supply Plan.

Public water suppliers serving more than 1,000 people are required to incorporate demand reduction measures into their water supply plan. The City's existing water rates are conservation neutral. Pelican Rapids should consider adopting a conservation rate schedule to help protect water resources. Current information as well as guidelines for demand reduction measures is found in Minnesota Statutes, section 103G.291 subdivisions 3 and 4. They are further described in the Demand Reduction Measures information included with this letter.

Helpful resources on Public Water Supply Plans can be found on the MNDNR website @ http://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/eandc_plan.html

Here are some additional recommendations based on our review of the revised plan:

- The City should consider constructing more water storage so there is a least one day's supply stored for an emergency.
- To better evaluate the effects of pumping on the aquifer the Department recommends that the City increase monitoring of the production wells. Water levels should be monitored at least on a monthly basis. Water level data needs to be stored and graphed to reveal any seasonal and long term water level trends.
- The water supply plan lists weak areas in the distribution system. The plan should prioritize capital improvements and discuss preventative maintenance.

- Water emergency responses are decided by the Utility Board or City Council. Please consider the efficiency of this process and if there are ways to reduce delays in the implementation of emergency response.

This approval is contingent upon the Department's receipt of confirmation that the City has adopted the Plan. Please complete and return to this office the attached "Certification of Adoption" form.

Thank you for your cooperation and efforts to manage and conserve water resources. If you have any questions, please contact Area Groundwater Hydrologist Janell Miersch at (218) 739-7576 ext. 253, or by email at janell.miersch@state.mn.us.

Sincerely,

Julie Aadland

Julie Aadland
Area Hydrologist
JA/ck

cc: Tom Hovey, Water Appropriation Program Manager
Carmelita Nelson, Water Conservation Consultant
Chad Kolstad, MDH
Janell Miersch, Area Ground Water Hydrologist
Barry Stratton, South District Manager
Peter Buesseler, Regional Manager

RECEIVED
MAY 19 2015
DNR Eco-Waters
Fergus Falls

CERTIFICATION OF ADOPTION
WATER SUPPLY PLAN

City of Water System Name: CITY OF PELICAN RAPIDS

Name of Person Authorized to Sign
Certification on Behalf of the System: DONALD SOLGA

Title: CITY ADMINISTRATOR
Address: BOX 350, PELICAN RAPIDS, MN 56572
Telephone: (218) 863-6571
Email: PRADMIN@LORETEL.NET

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: Donald Solga
City Administrator

Date: 5-12-2015

Fax (218) 739-7601 or mail this certificate to:
MN DNR – EWR
1509 1st Avenue North
Fergus Falls, MN 56537

APPENDIX V - Required Documentation

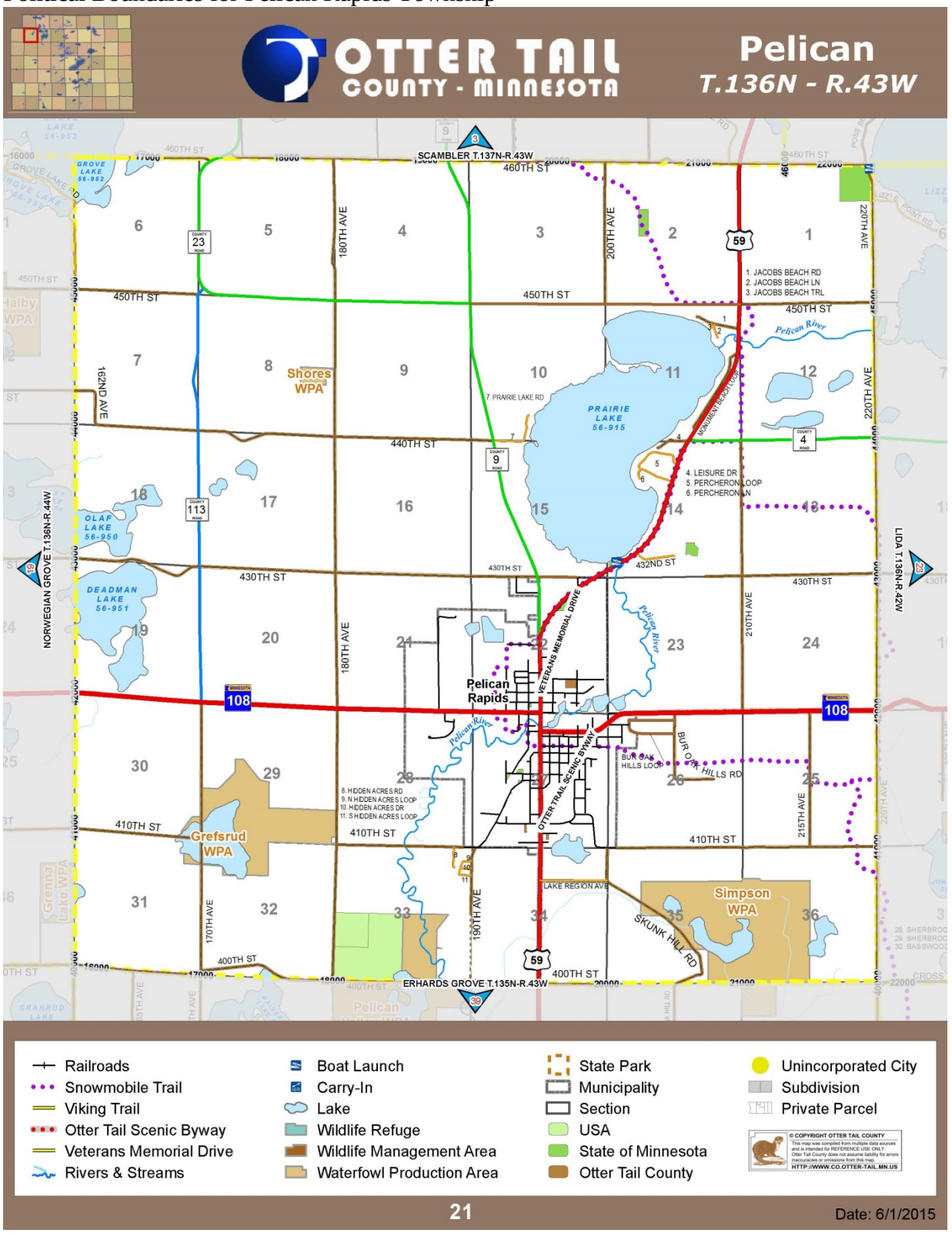
Precipitation Data

Monthly Sum of Precipitation (Inches)

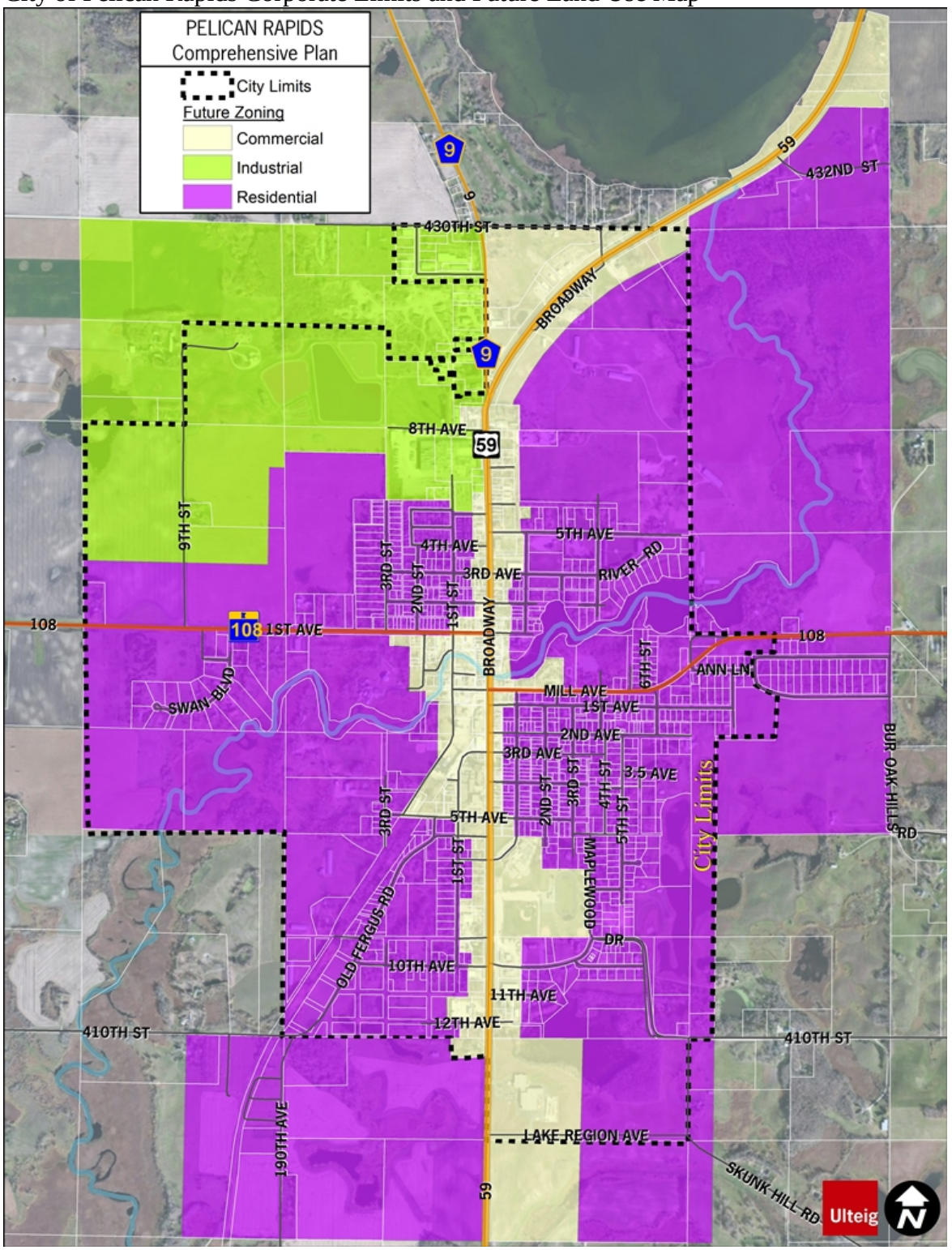
YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
2010	0.88	0.56	0.91	1.82	2.83	2.72	10.52	6.32	6.10	3.24	1.09	1.42	38.41
2011	0.85	0.23	1.00	1.79	2.08	3.06	4.04	1.98	0.67	0.38	0.19	0.25	16.52
2012	0.42	0.64	1.23	4.00	3.60	3.22	5.73	2.73	0.44	1.57	0.47	0.62	24.67
2013	1.04	1.07	2.09	1.12	5.09	3.76	3.00	0.00	6.00	4.93	0.00	0.00	28.10
2014	1.00	0.00	0.74	4.00	6.00	10.00	2.60	4.00	2.80	0.52	1.10	0.00	32.76
2015	0.00	0.00	0.60	1.00	5.70	3.10	2.60	2.00	0.00	0.00	0.00	0.00	15.00

Data collected from the City’s Waste Water Plant

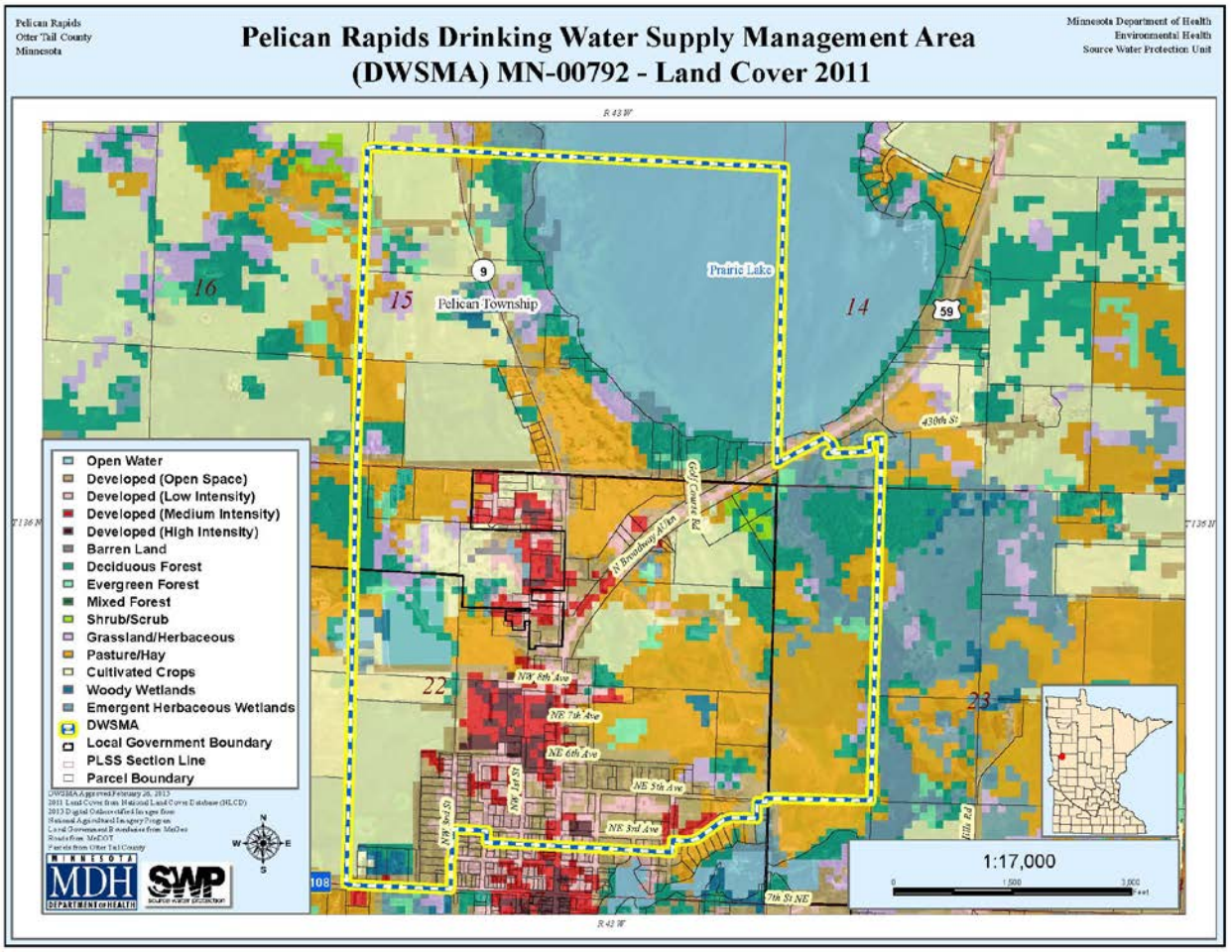
Political Boundaries for Pelican Rapids Township



City of Pelican Rapids Corporate Limits and Future Land Use Map



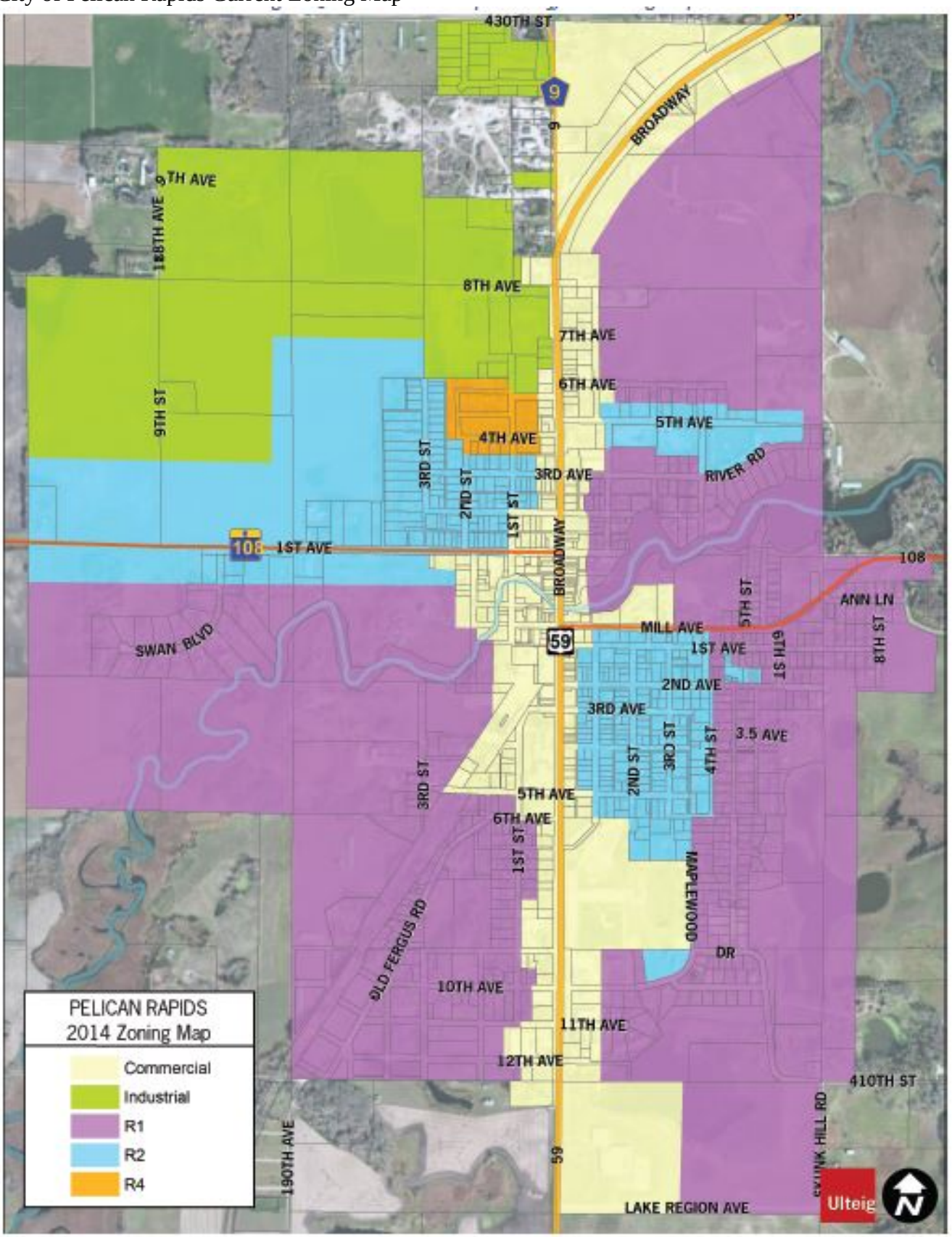
City of Pelican Rapids Land Cover Map



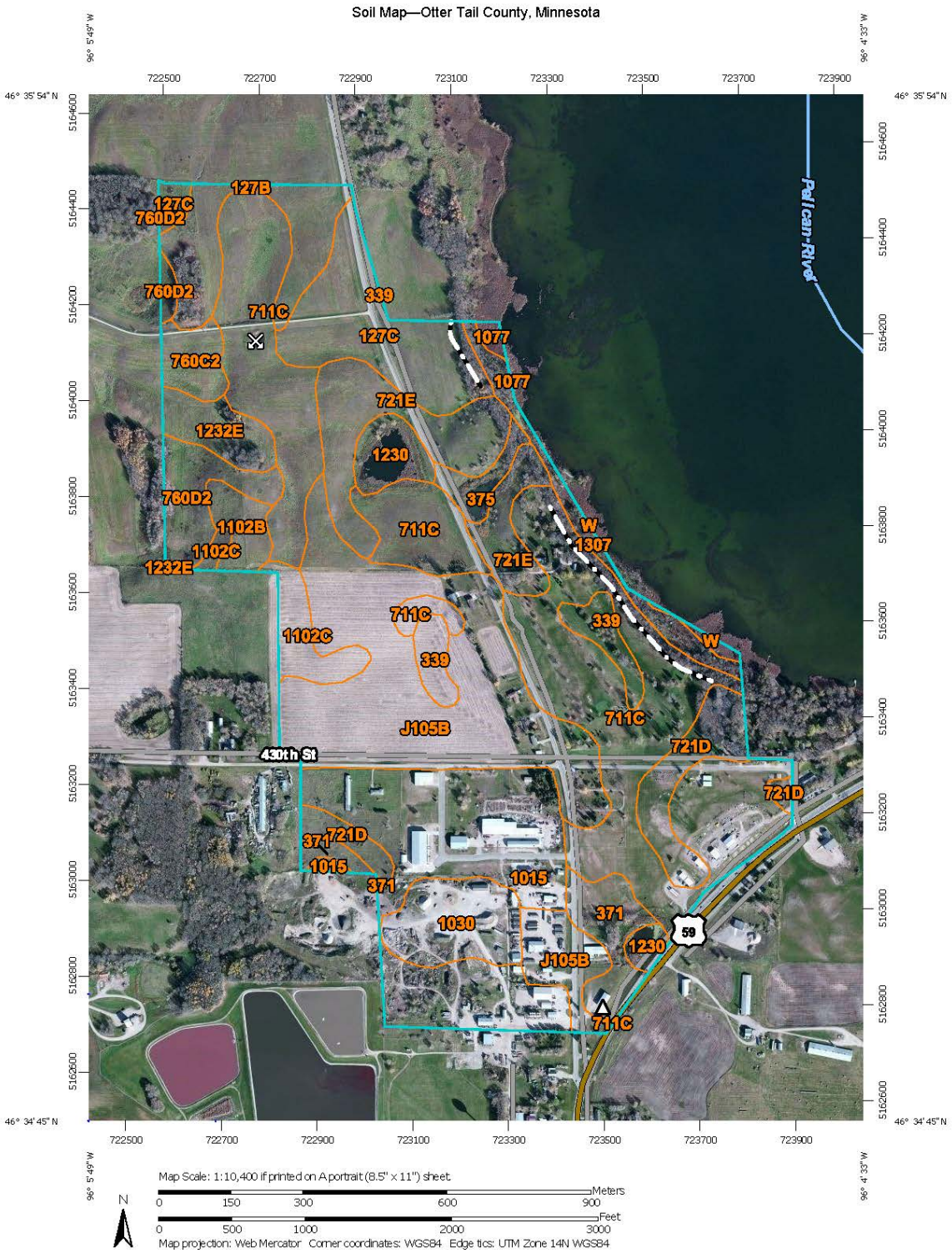
Pelican Rapids DWSMA Land Cover

LAND_COVER	ACRES	PERCENT	YEAR
Open Water	212.85	17.79	2011
Developed, Open Space	139.31	11.65	2011
Developed, Low Intensity	64.21	5.37	2011
Developed, Medium Intensity	52.88	4.42	2011
Developed, High Intensity	16.66	1.39	2011
Barren Land (Rock/Sand/Clay)	1.33	0.11	2011
Deciduous Forest	115.76	9.68	2011
Evergreen Forest	18.89	1.58	2011
Shrub/Scrub	3.11	0.26	2011
Grassland/Herbaceous	34.44	2.88	2011
Pasture/Hay	247.07	20.65	2011
Cultivated Crops	226.18	18.91	2011
Woody Wetlands	10.00	0.84	2011
Emergent Herbaceous Wetlands	53.55	4.48	2011
Total	1196.22	100.00	2011

City of Pelican Rapids Current Zoning Map



Soil Types Located within the Pelican Rapids DWSMA



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Otter Tail County, Minnesota
Survey Area Data: Version 10, Sep 16, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 6, 2010—Oct 15, 2010

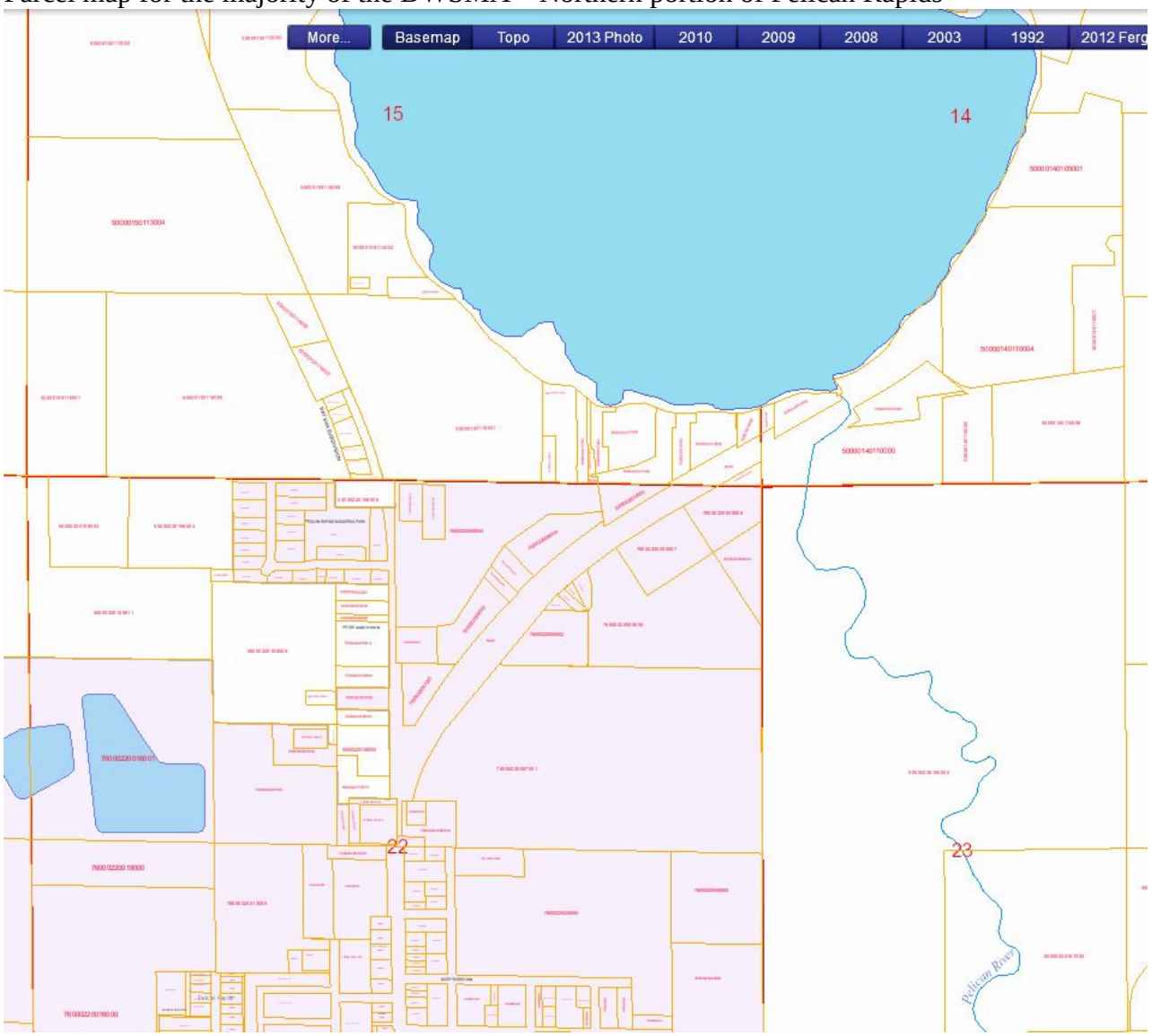
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

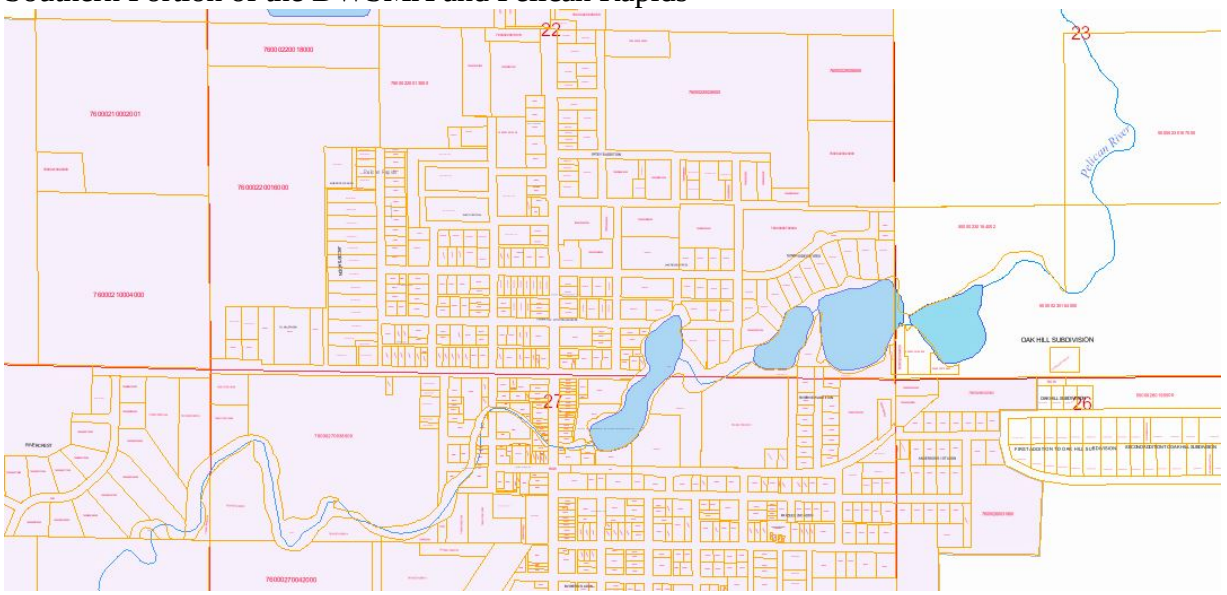
Otter Tail County, Minnesota (MN111)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
127B	Sverdrup sandy loam, 2 to 6 percent slopes	13.5	4.1%
127C	Sverdrup sandy loam, 6 to 12 percent slopes	21.1	6.4%
339	Fordville loam	6.7	2.0%
371	Clontarf sandy loam	9.4	2.8%
375	Forada loam	3.3	1.0%
711C	Arvilla-Sandberg complex, 6 to 12 percent slopes	84.8	25.7%
721D	Corliss loamy sand, 12 to 20 percent slopes	12.7	3.9%
721E	Corliss loamy sand, 20 to 35 percent slopes	21.8	6.6%
760C2	Chapett-Sisseton complex, 6 to 12 percent slopes, eroded	4.7	1.4%
760D2	Chapett-Sisseton complex, 12 to 20 percent slopes, eroded	9.3	2.8%
1015	Udipsamments (cut and fill land)	41.6	12.6%
1030	Pits, gravel-Udipsamments complex	11.3	3.4%
1077	Forada and Leafriver soils, depressional	0.8	0.2%
1102B	Chapett-Dorset complex, 1 to 6 percent slopes	4.4	1.3%
1102C	Chapett-Dorset complex, 6 to 12 percent slopes, eroded	6.6	2.0%
1230	Haslie and Nidaros soils, ponded	6.6	2.0%
1232E	Chapett loam, 20 to 30 percent slopes	6.2	1.9%
1307	Rushlake sand	6.4	1.9%
J105B	Arvilla sandy loam, MLRA 102A, 2 to 6 percent slopes	57.6	17.5%
W	Water	0.8	0.2%
Totals for Area of Interest		**329.6**	**100.0%**

Pelican Rapids Area Parcel Map

Parcel map for the majority of the DWSMA – Northern portion of Pelican Rapids



Southern Portion of the DWSMA and Pelican Rapids



Additional parcel information is available on the Otter Tail County Website.
http://www.ottertailcounty.us/ez/publicsearch.php

CONSUMER CONFIDENCE REPORT

PWSID: 1560019

City of Pelican Rapids
2015 Drinking Water Report

The City of Pelican Rapids 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 Pelican Rapids provides drinking water to its residents from a groundwater source: five wells ranging from 108 to 422 feet deep, that draw water from the Quat. Water Table and Quat. Buried Artes. aquifers.

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 218-863-6571 if you have questions about the City of Pelican Rapids 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.

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).

N/A—Not Applicable (does not apply).

Contaminant (units)	MCLG	MCL	Level Found		Typical Source of Contaminant
			Range (2015)	Average /Result*	
Barium (ppm) (02/27/2013)	2	2	N/A	.26	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Fluoride (ppm)	4	4	.73-1.1	1.13	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	N/A	3.9	By-product of drinking water disinfection.
Nitrate (as Nitrogen) (ppm)	10.4	10.4	N/A	1.2	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
TTHM (Total trihalomethanes) (ppb)	0	80	N/A	26.5	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	.05-.9	.44	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)	1.3	1.3	.65	1 out of 10	Corrosion of household plumbing systems; Erosion of natural deposits.
Lead (ppb)	0	15	2.1	1 out of 10	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 Pelican Rapids 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.

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.

Información importante. Si usted no entiende que alguien lo traduzca para usted ahora.

MINNESOTA MDH DEPARTMENT of HEALTH
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	1560019	**COMMUNITY**
NAME	Pelican Rapids	
ADDRESS	Pelican Rapids Water Superintendent, Pelican Rapids City Hall, P.O. Box 350, Pelican Rapids, MN 565720350	

FACILITY (WELL) INFORMATION

NAME	Well #7	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S05	☐ YES (Please attach a copy)
UNIQUE WELL NO.	215513	☐ NO ☐ UNDETERMINED
COUNTY	Otter Tail	

PWS ID / FACILITY ID	1560019 S05	UNIQUE WELL NO.	215513

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	1560019 S05	UNIQUE WELL NO.	215513

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		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		Y	181	
WEL	Operating well	record dist.	record dist.		Y	198	
WEL	Operating well	record dist.	record dist.		Y	128	
WEL	Operating well	record dist.	record dist.		Y	20	
WEL	Operating well	record dist.	record dist.		Y	76	
WEL	Operating well	record dist.	record dist.		Y	66	
WEL	Operating well	record dist.	record dist.		Y	76	
WEL	Operating well	record dist.	record dist.		Y	119	
WEL	Operating well	record dist.	record dist.		Y	190	N
WEL	Operating well	record dist.	record dist.		Y	1	N**
WEL	Operating well	record dist.	record dist.		Y	66	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		

PWS ID / FACILITY ID	1560019 S05	UNIQUE WELL NO.	215513

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				
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		
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							
SBM	Sewer, buried collector, municipal, pressurized, open jointed, or unapproved materials	50	50		Y	123	N**
SWD	Storm water drain pipe, 12 inches or greater	50	20		Y	145	N
ETL	Electric transmission line	5/10	5/10		Y	89	Y**
ETL	Electric transmission line	5/10	5/10		Y	40	Y
FFH	Fire or flushing hydrant	10	N/A		Y	138	Y**

* New potential contaminant source.

** This number is the estimated distance that this potential source is from this well even though it was identified during an inventory for an adjacent well.

[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.

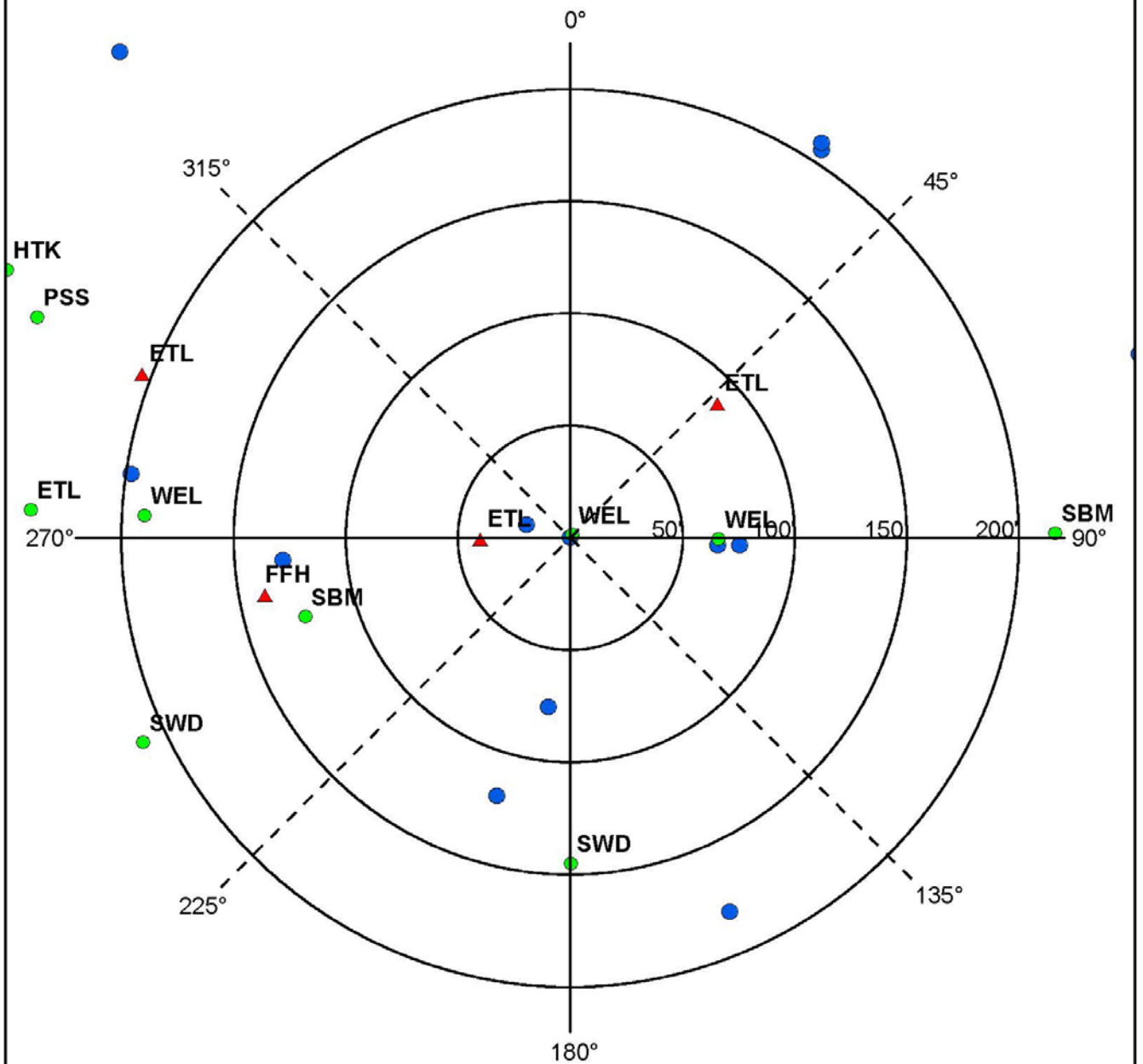
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1560019 S05	UNIQUE WELL NO.	215513

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	Meyer, Aaron	DATE	1 - 13 - 2016

PWS ID / FACILITY ID	1560019 S05	UNIQUE WELL NO.	215513

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.		
Best management practices should be employed for outdoor chemical use, to prevent stormwater from moving chemical contaminants to surface waters or where wells could be impacted.		
The monitoring well should have a properly secured well cap and the well casing should be inspected for damage. An at-grade monitoring well should be inspected to verify that the vault cover is watertight, secured, and provided with a well identification label.		

COMMENTS

9/7/2003 - Location for PCSI Type BLD (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type ETL (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type GSP (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type PLE (bearing = 0, distance = 0 , inventory date: 6/9/1999) 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

MINNESOTA MDH DEPARTMENT of HEALTH
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	1560019	**COMMUNITY**
NAME	Pelican Rapids	
ADDRESS	Pelican Rapids Water Superintendent, Pelican Rapids City Hall, P.O. Box 350, Pelican Rapids, MN 565720350	

FACILITY (WELL) INFORMATION

NAME	Well #8	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S06	☐ YES (Please attach a copy)
UNIQUE WELL NO.	215511	☐ NO ☐ UNDETERMINED
COUNTY	Otter Tail	

PWS ID / FACILITY ID	1560019 S06	UNIQUE WELL NO.	215511

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	1560019 S06	UNIQUE WELL NO.	215511

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		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.		Y	185	
MON	Monitoring well	record dist.	record dist.		Y	182	
WEL	Operating well	record dist.	record dist.		Y	194	
WEL	Operating well	record dist.	record dist.		Y	85	
WEL	Operating well	record dist.	record dist.		Y	66	
WEL	Operating well	record dist.	record dist.		Y	10	
WEL	Operating well	record dist.	record dist.		Y	163	
WEL	Operating well	record dist.	record dist.		Y	149	
WEL	Operating well	record dist.	record dist.		Y	3	N**
WEL	Operating well	record dist.	record dist.		Y	65	N
WEL	Operating well	record dist.	record dist.		Y	104	
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		

PWS ID / FACILITY ID	1560019 S06	UNIQUE WELL NO.	215511

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				
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		
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							
SBM	Sewer, buried collector, municipal, pressurized, open jointed, or unapproved materials	50	50		Y	187	N**
SBM	Sewer, buried collector, municipal, pressurized, open jointed, or unapproved materials	50	50		Y	150	N
SWD	Storm water drain pipe, 12 inches or greater	50	20		Y	156	N**
ETL	Electric transmission line	5/10	5/10		Y	106	Y**
ETL	Electric transmission line	5/10	5/10		Y	63	Y
FFH	Fire or flushing hydrant	10	N/A		Y	203	Y**

* New potential contaminant source.

** This number is the estimated distance that this potential source is from this well even though it was identified during an inventory for an adjacent well.

[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.

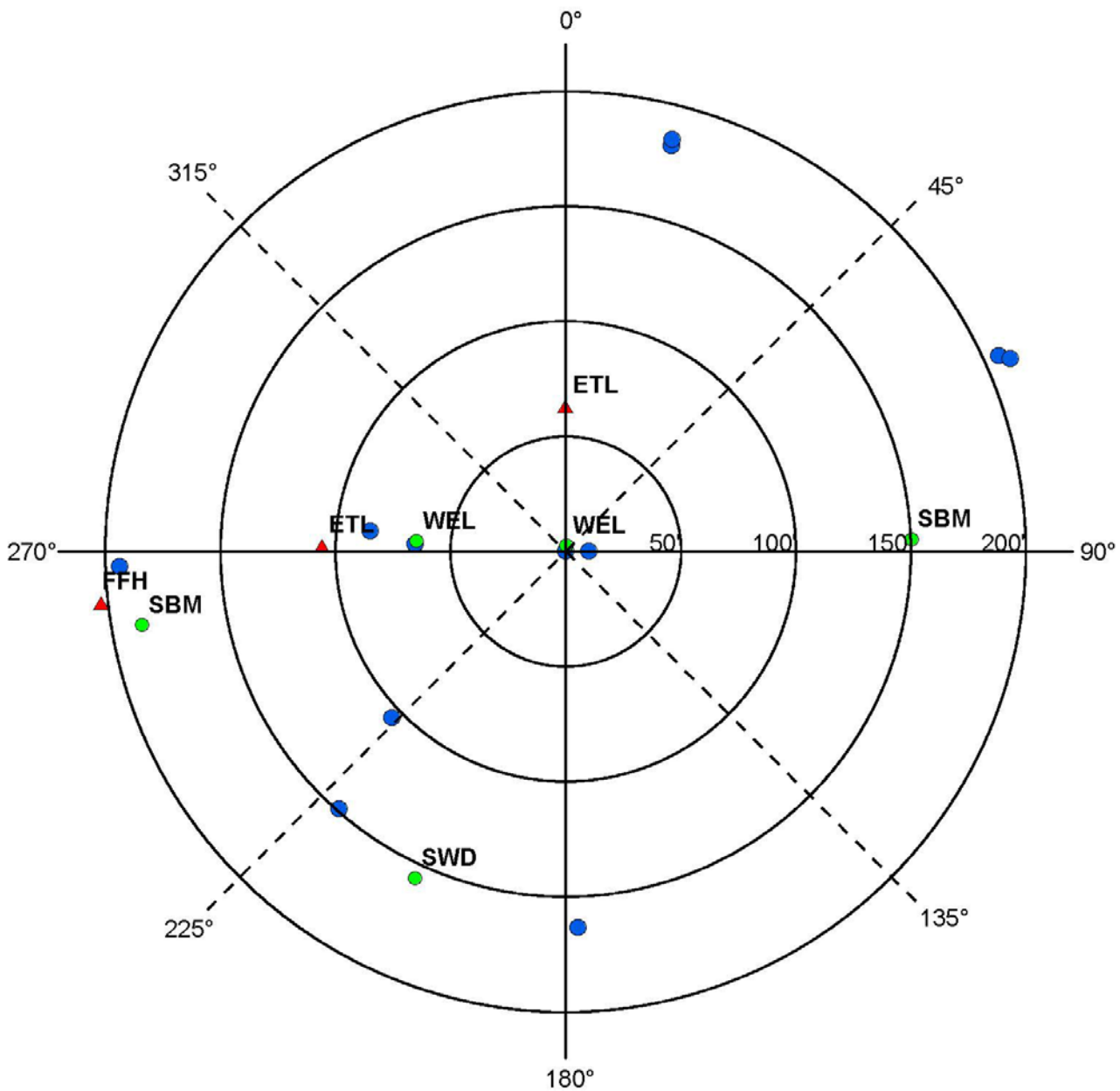
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1560019 S06	UNIQUE WELL NO.	215511

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	Meyer, Aaron	DATE	1 - 13 - 2016

PWS ID / FACILITY ID	1560019 S06	UNIQUE WELL NO.	215511

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.		
Best management practices should be employed for outdoor chemical use, to prevent stormwater from moving chemical contaminants to surface waters or where wells could be impacted.		
The monitoring well should have a properly secured well cap and the well casing should be inspected for damage. An at-grade monitoring well should be inspected to verify that the vault cover is watertight, secured, and provided with a well identification label.		

COMMENTS

9/7/2003 - Location for PCSI Type DWT (bearing = 0, distance = 0 , inventory date: 6/9/1999) 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

MINNESOTA MDH DEPARTMENT of HEALTH
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	1560019	**COMMUNITY**
NAME	Pelican Rapids	
ADDRESS	Pelican Rapids Water Superintendent, Pelican Rapids City Hall, P.O. Box 350, Pelican Rapids, MN 565720350	

FACILITY (WELL) INFORMATION

NAME	Well #9	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S07	☐ YES (Please attach a copy)
UNIQUE WELL NO.	215512	☐ NO ☐ UNDETERMINED
COUNTY	Otter Tail	

PWS ID / FACILITY ID	1560019 S07	UNIQUE WELL NO.	215512

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	1560019 S07	UNIQUE WELL NO.	215512

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		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.		Y	201	
MON	Monitoring well	record dist.	record dist.		Y	197	
MON	Monitoring well	record dist.	record dist.		Y	183	
MON	Monitoring well	record dist.	record dist.		Y	180	
WEL	Operating well	record dist.	record dist.		Y	10	
WEL	Operating well	record dist.	record dist.		Y	76	
WEL	Operating well	record dist.	record dist.		Y	112	
WEL	Operating well	record dist.	record dist.		Y	95	
WEL	Operating well	record dist.	record dist.		Y	163	
WEL	Operating well	record dist.	record dist.		Y	155	
WEL	Operating well	record dist.	record dist.		Y	75	N**
WEL	Operating well	record dist.	record dist.		Y	10	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		

PWS ID / FACILITY ID	1560019 S07	UNIQUE WELL NO.	215512

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				
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		
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							
SBM	Sewer, buried collector, municipal, pressurized, open jointed, or unapproved materials	50	50		Y	196	N**
SBM	Sewer, buried collector, municipal, pressurized, open jointed, or unapproved materials	50	50		Y	140	N**
SWD	Storm water drain pipe, 12 inches or greater	50	20		Y	161	N**
ETL	Electric transmission line	5/10	5/10		Y	64	Y**
ETL	Electric transmission line	5/10	5/10		Y	115	Y**

* New potential contaminant source.

** This number is the estimated distance that this potential source is from this well even though it was identified during an inventory for an adjacent well.

[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.

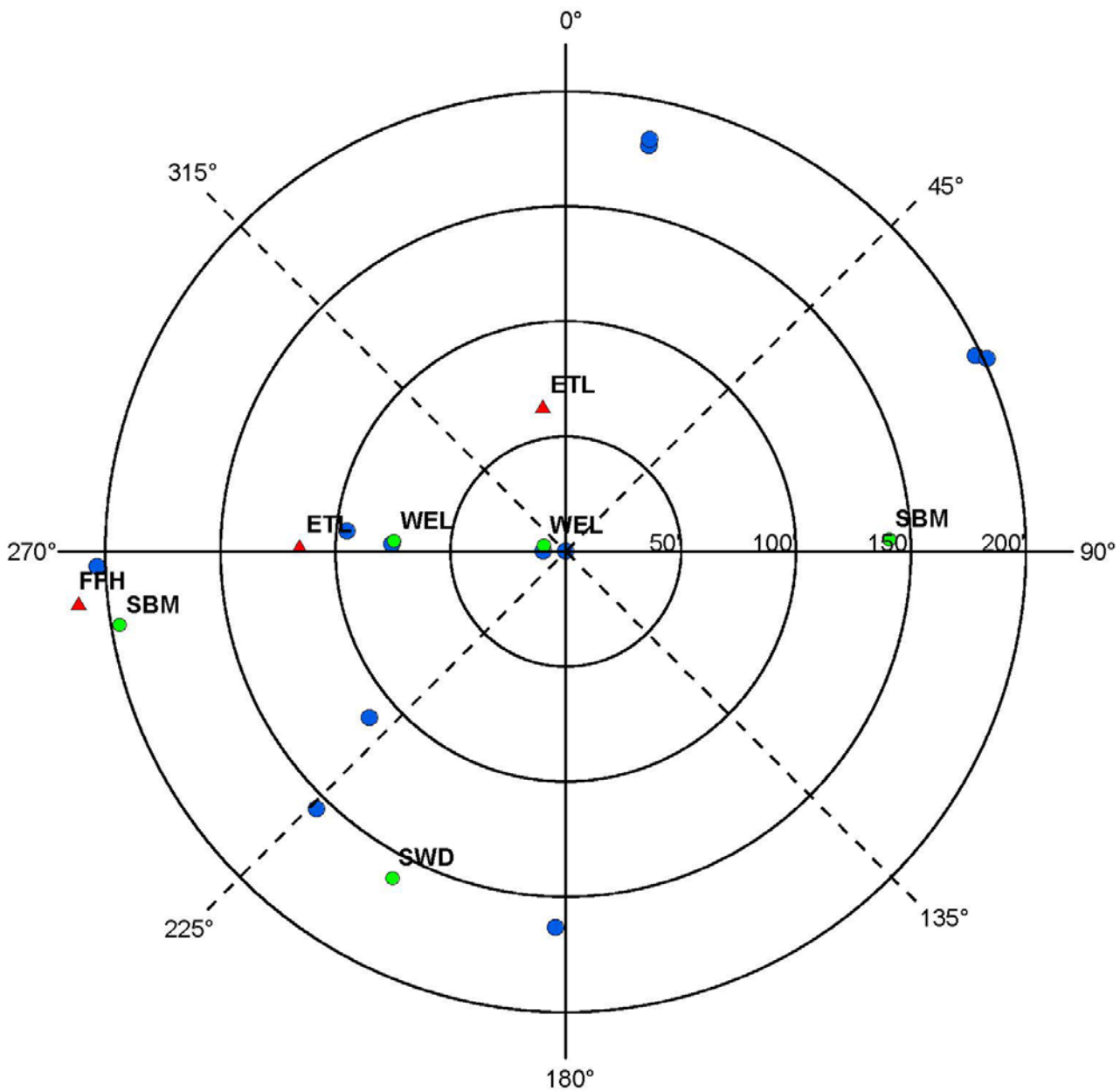
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1560019 S07	UNIQUE WELL NO.	215512

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	Meyer, Aaron	DATE	1 - 13 - 2016

PWS ID / FACILITY ID	1560019 S07	UNIQUE WELL NO.	215512

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.		
Best management practices should be employed for outdoor chemical use, to prevent stormwater from moving chemical contaminants to surface waters or where wells could be impacted.		
The monitoring well should have a properly secured well cap and the well casing should be inspected for damage. An at-grade monitoring well should be inspected to verify that the vault cover is watertight, secured, and provided with a well identification label.		

COMMENTS

9/7/2003 - Location for PCSI Type BLD (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type ETL (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type GSP (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type SBM (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type PLE (bearing = 0, distance = 0 , inventory date: 6/9/1999) 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

MINNESOTA MDH DEPARTMENT of HEALTH
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	1560019	**COMMUNITY**
NAME	Pelican Rapids	
ADDRESS	Pelican Rapids Water Superintendent, Pelican Rapids City Hall, P.O. Box 350, Pelican Rapids, MN 565720350	

FACILITY (WELL) INFORMATION

NAME	Well #13	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S11	☐ YES (Please attach a copy)
UNIQUE WELL NO.	445082	☐ NO ☐ UNDETERMINED
COUNTY	Otter Tail	

PWS ID / FACILITY ID	1560019 S11	UNIQUE WELL NO.	445082

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	1560019 S11	UNIQUE WELL NO.	445082

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		Y	200	N
SS1	Sewage sump capacity 100 gal. or more	50	50		N		
SS2	Sewage sump capacity less than 100 gal., tested, conforming to rule	50	20		N		
*ST1	Sewage treatment device, watertight	50	50		N		
SB1	Sewer, buried, approved materials, tested, serving one building, or two or less single-family residences	50	20		N		
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		N		
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		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	1560019 S11	UNIQUE WELL NO.	445082

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							
SBM	Sewer, buried collector, municipal, pressurized, open jointed, or unapproved materials	50	50		Y	195	N
ETL	Electric transmission line	5/10	5/10		Y	52	N
FFH	Fire or flushing hydrant	10	N/A		Y	42	Y
PLE	Property line or easement	50	N/A		Y	50	N

* 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.

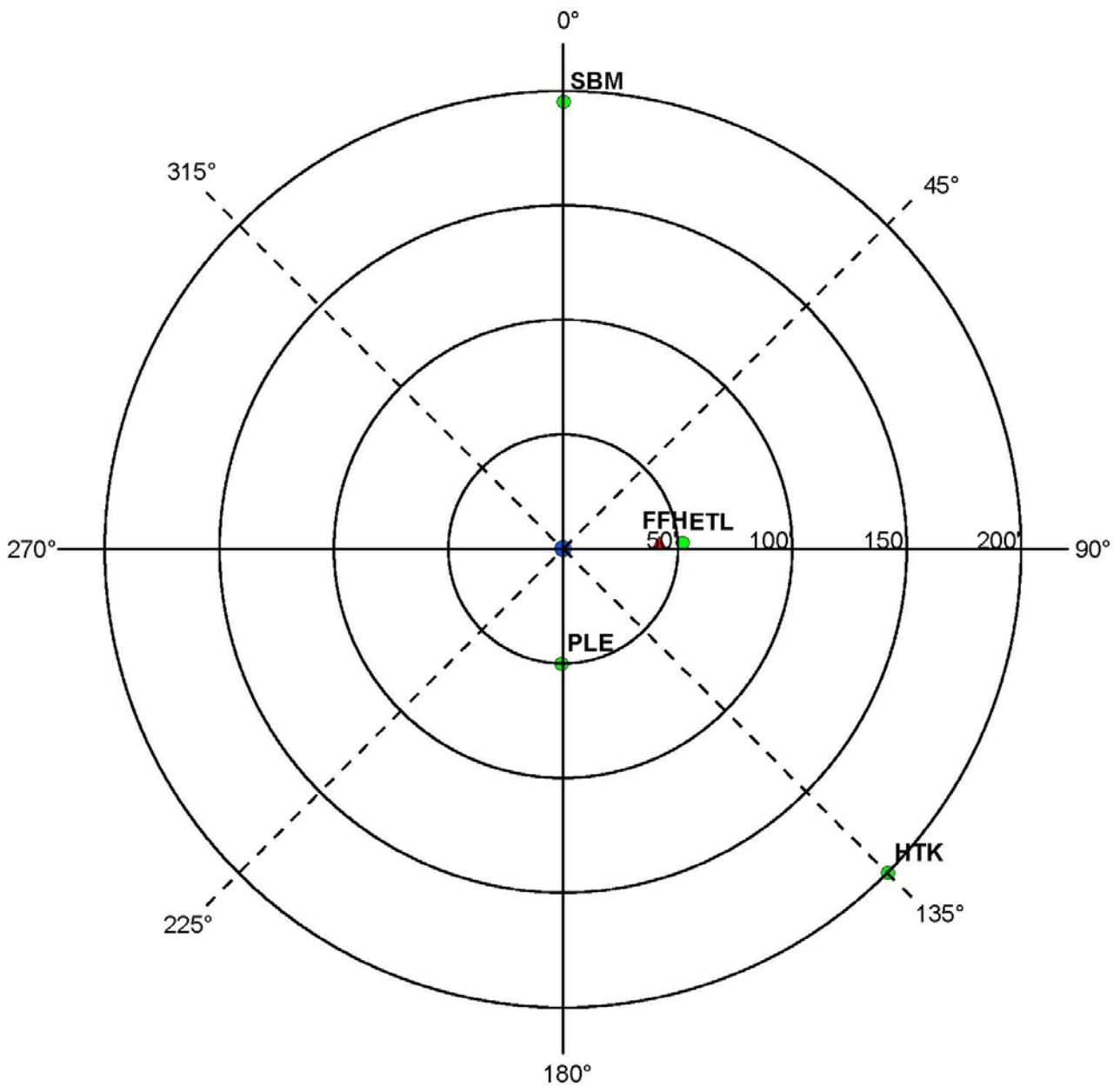
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1560019 S11	UNIQUE WELL NO.	445082

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	Meyer, Aaron	DATE	1 - 13 - 2016

PWS ID / FACILITY ID	1560019 S11	UNIQUE WELL NO.	445082

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Have septic tanks periodically pumped by a licensed pumper. Tank baffles and integrity should be evaluated at the time of each pumping. See Minnesota Rules 7080.0175. (www.revisor.leg.state.mn.us/forms/getrule.shtml)		
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.		

COMMENTS

9/7/2003 - Location for PCSI Type BLD (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type CBL (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type ETL (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type FFH (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type GPR (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
9/7/2003 - Location for PCSI Type PLE (bearing = 0, distance = 0 , inventory date: 6/9/1999) could not be determined.
5/3/2005 - A gravel mining operation is located in close proximity to the city property and pws well.

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

MINNESOTA MDH DEPARTMENT of HEALTH
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	1560019	**COMMUNITY**
NAME	Pelican Rapids	
ADDRESS	Pelican Rapids Water Superintendent, Pelican Rapids City Hall, P.O. Box 350, Pelican Rapids, MN 565720350	

FACILITY (WELL) INFORMATION

NAME	Well #15	**IS THERE A WELL LOG OR ADDITIONAL CONSTRUCTION INFORMATION AVAILABLE?**
FACILITY ID	S13	☐ YES (Please attach a copy)
UNIQUE WELL NO.	753273	☐ NO ☐ UNDETERMINED
COUNTY	Otter Tail	

PWS ID / FACILITY ID	1560019 S13	UNIQUE WELL NO.	753273

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	1560019 S13	UNIQUE WELL NO.	753273

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	80	Y
SB2	Sewer, buried, collector, municipal, serving a facility handling infectious or pathological wastes, open-jointed or unapproved materials	50	50		Y	80	Y
*WB1	Water treatment backwash holding basin, reclaim basin, or surge tank with a direct sewer connection	50	50		N		
*WB2	Water treatment backwash holding basin, reclaim basin, or surge tank with a backflow protected sewer connection	20	20		N		
Land Application							
SPT	Land spreading area for sewage, septage, or sludge	50	50	100	N		
Solid Waste Related							
COS	Commercial compost site	50	50		N		
CD1	Construction or demolition debris disposal area	50	50	100	N		
*HW1	Household solid waste disposal area, single residence	50	50	100	N		
LF1	Landfill, permitted demolition debris, dump, or mixed municipal solid waste from multiple persons	300	300	600	N		
SVY	Scrap yard	50	50		N		
SWT	Solid waste transfer station	50	50		N		
Storm Water Related							
SD1	Storm water drain pipe, 8 inches or greater in diameter	50	20		N		
SWI	Storm water drainage well[2] (Class V well - illegal[3])	50	50		N		
SM1	Storm water pond greater than 5000 gal.	50	35		N		
Wells and Borings							
*EB1	Elevator boring, not conforming to rule	50	50		N		
*EB2	Elevator boring, conforming to rule	20	20		N		
MON	Monitoring well	record dist.	record dist.		N		
WEL	Operating well	record dist.	record dist.		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	1560019 S13	UNIQUE WELL NO.	753273

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		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.

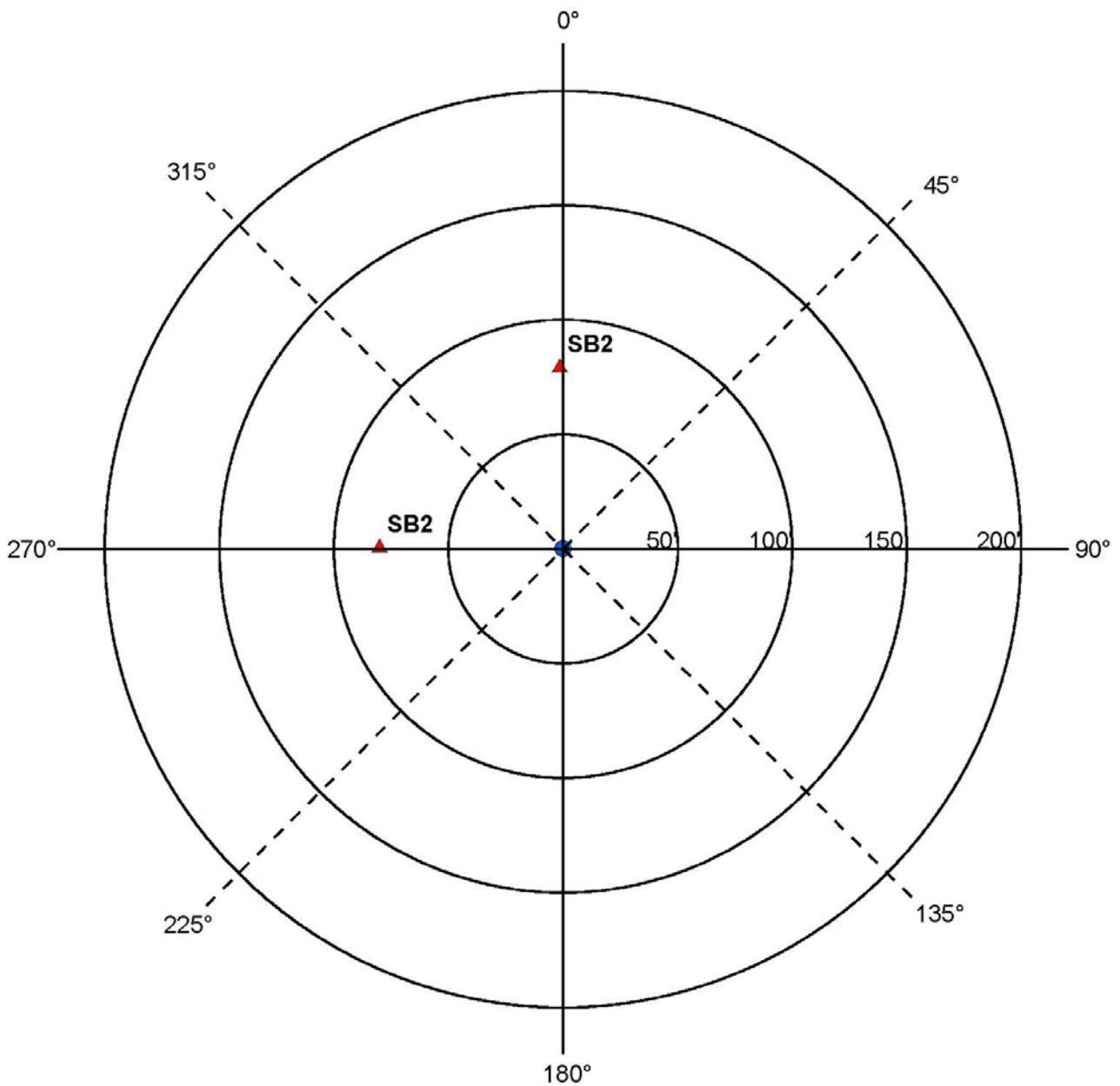
[5] A community public water-supply well must be a minimum of 50 feet from a petroleum tank or container, unless the tank or container is used for emergency pumping and is located in a room or building separate from the community well; and is of double-wall construction with leak detection between walls; 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	1560019 S13	UNIQUE WELL NO.	753273

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	Meyer, Aaron	DATE	1 - 13 - 2016

PWS ID / FACILITY ID	1560019 S13	UNIQUE WELL NO.	753273

RECOMMENDED WELLHEAD PROTECTION (WHP) MEASURES	WHP MEASURE IMPLEMENTED? Y or N	DATE VERIFIED
Any sewer lines that are observed to be leaking, cracked, or deteriorated, should be replaced.		

COMMENTS

For further information, please contact:

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P.O. Box 64975
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